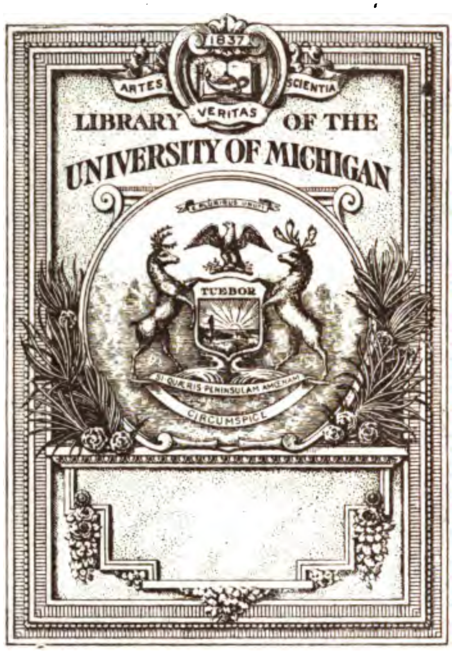
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CONDUCTED

BY W. NEWTON,

CIVIL ENGINEER AND MECHANICAL DRAFTSMAN.

(Assisted by several Scientific Gentlemen.)

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Recent Patents.

To Joseph Whitworth, *of Manchester, in the county of Lancaster, engineer, for his invention of certain improvements in machinery for spinning and doubling cotton, flax, wool, silk, and other fibrous substances.*—[Sealed 14th April, 1835.]

These improvements in machinery for spinning cotton, flax, wool, and other fibrous substances, apply to those descriptions of machinery called mules, billies, jennies, and stretching frames upon the self-acting principle, and to throstles and doubling-frames. In reference to the self-acting mules, &c., the machinery is designed, first, to traverse the carriage in and out, by means of screws or worm shafts, which are placed so as to keep the carriage parallel to the drawing rollers, and prevent the necessity of squaring bands; second, in an

improved manner of working the drums of a self-acting mule by gear; third, in the means of effecting the backing off; fourth, the mechanism for working the faller wire in building the cops; and, fifth, the apparatus for effecting the winding of the yarns on to the spindles; and as regards the throstles and doubling-frames, the improvements apply, first, to the peculiar method of constructing and adapting the flyers and spindles, and effecting the drag; and, second, the arrangement of the other parts of the spinning and doubling machinery.

The following is the description of the Patentee:—Fig. 1, Plate 1, is a horizontal representation of the mule, showing the plan of the gearing by which it is driven, constructed upon what is called the "box-organ" principle; fig. 2, is an end elevation, exhibiting one of the parallel screws or worm shafts, in which the carriage is shown partly in section; fig. 3, is a vertical section taken transversely through the driving gear, near the middle of the mule; fig. 4, is a similar transverse section, taken in the same direction as fig. 3, at a very little distance beyond it; fig. 5, is a front elevation of the driving gear and front rollers, the mule carriage being withdrawn.

The respective letters of reference point out the same parts of the machinery in the several figures of the mule. The creel on which the bobbins of roving are placed is shown at A, A, A; and the beam that supports the drawing rollers at B, B, B; the carriage of the mule is marked C, C, C; and D, D, are the railways on which the carriage runs. The machinery is driven by a strap from the first mover, carried round the pulley F, fixed upon the main shaft G. In order to drive the rollers, a wheel *a*, fixed on the main shaft G, takes into another

wheel *b*, on the shaft *c*; this shaft carries a bevel wheel *d*, taking into a similar bevel wheel *e*, fixed on a vertical shaft *f*, (see fig. 4.) At the upper end of this shaft is another toothed wheel *g*, which drives the tumbling shaft *h*, and this gives motion to the drawing rollers in the ordinary way. For running out the mule carriage, the clutch-box *i*, is slidden so as to lock together the shaft G, and the bevel wheel *k*; which wheel *k*, then drives the bevel wheels l^1, and l^2, on the inner extremities of the longitudinal shafts m^1, and m^2. At the reverse or outer ends of these shafts m^1, and m^2, there are bevel wheels *n*, *n*, taking into the bevel pinions *o*, *o*, fixed to the end of each of the screws or worm shafts E, E, by means of which the screws are made to turn. In the under part of the mule carriage C, friction rollers *p*, *p*, (see fig. 2) are mounted, the peripheries of which run against the sides of the threads of the screws E, E, and as the screws revolve, give motion to the carriage.

For the better illustration of this part of the machine, I have shown, in the detached horizontal view, fig. 6, a portion of one of the screws E, with the friction rollers mounted on studs, extending from the carriage, and acting against the sides of the threads of the screws, by the lateral force of which thread against the friction rollers, as the screws turn the carriage, is forced along upon the railways D, D.

For the purpose of driving the drums which actuate the spindles, the wheel H, which turns loosely upon the main shaft G, is locked to that shaft by the sliding clutch *q*. This wheel takes into the wheel I, fixed on the grooved shaft M; which shaft carries a sliding bevel wheel N, working in the bevel wheel O, at the lower end of an upright shaft *r*, in the middle of the carriage (see

figs. 1 and 3). Upon this upright shaft is also fixed a bevel wheel P, taking into the bevel wheels at the inner extremities of the longitudinal shafts Q, Q, which are mounted in bearings in the carriage under the drums. These shafts give rotary motion to the drums by means of bevel gear (see fig. 4), and from the drums bands extend, which drive the spindles in the ordinary way; one of the transverse bearing bars, in which the longitudinal shafts Q, Q, are supported, is shown upon a larger scale, detached at fig. 7 in elevation, and at fig. 8 in a plan or horizontal view. The top of the cap or cover *z*, which confines the journal of the shaft, receives the step for the end of the axle of the drum to turn in. As, however, the position of the axle of the drum may require to be placed more or less inclined from the perpendicular, the cap or cover is attached to the side of the bearing by screws passed through slots in the ears of the cap, which are brought down sufficiently long for that purpose, and thereby admit the position of the step in the top of the cap to be shifted to the required adjustment. A small shaft R, R, is mounted in suitable bearings in the framing of the driving gear, which shaft makes one revolution for every traverse of the mule carriage, and has a series of cams for performing the several changes of the movements. This cam shaft R, has a toothed wheel fixed upon it, and is driven by an endless screw S, on the transverse shaft *c*.

In order to stop the rollers when the proper lengths of yarn have been delivered, the cam *w*, on the shaft R, in revolving, depresses the longer arm of the lever *x*, (see fig. 4.) The reverse end of this lever is connected to the lower end of a rod *y*, the upper end of which rod is attached to the tumbling shaft *h*; therefore, by

depressing the levers x, the tumbling shaft will be lifted, and its pinion raised out of the teeth of the wheel g, by which it was driven, and the rotation of the rollers will consequently cease when the mule carriage has run out to that part of its course at which the rollers have ceased to deliver; the carriage must be made to move slower, for the purpose of stretching the yarns, which is requisite in fine spinning.

To effect this, the cam j, on the shaft R, as it revolves, acts upon a lever connected with the clutch i, and at this time throws that clutch back into the position shown in the horizontal view, fig. 1, for the purpose of disengaging the bevel wheel k, from the main driving shaft G; at the same time a similar cam s, also on the shaft R, acts upon a lever connected to a worm wheel V; which wheel slides longitudinally on the shaft m^2, but is made to revolve with the shaft by a protecting key. By these means, the teeth of the wheel V, are brought into gear with a worm or endless screw on the transverse shaft W; and a wheel t, fixed on the shaft W, being actuated through an intermediate wheel from the wheel a, on the main driving shaft G, causes the worm and shaft W, to give rotary motion to the wheel V, and consequently to the longitudinal shaft m^2, to which it is keyed. At the inner extremity of the shaft m^2, is fixed the bevel wheel l^2, before described, taking into the wheel k; which wheel k, now acts as an intermediate or carrier for driving the wheel l^1, on the shaft m^1. Thus it will be perceived, that instead of driving the wheels l^1, and l^2, the shafts m^1, and m^2, and the screws E, E, by which the carriage was run out immediately through the wheel k, when locked by the clutch to the main shaft G, I now drive them from the wheel a, on the main shaft through the wheel t, the shaft and worm

W, and wheel V, keyed to the shaft m^2; which train actuates the screws E, E, with a diminished speed, and causes the carriage C, C, C, to move very slowly, while effecting the extra stretch of the yarns. When the wheel V, is thrown into gear with the shaft m^2, for moving the carriage by the slower speed, the clutch *q*, is made to lock the wheel L, to the main driving shaft G; which wheel L, being of larger diameter than the wheel H, and taking into the wheel K, fixed on the shaft M, gives an increased rotary movement to the shaft M, and consequently causes the spindles to revolve with a greater speed, to effect the extra twist.

In spinning yarns of lower numbers, when only about one inch of stretch may be required, the slow movement of the carriage toward the end of its run may be effected simply by forming the last coils of the threads of the screws E, E, of a finer rake; that is, more acute than on the other parts of the screw; which variation in the rake of the threads also produces a temporary pause in the traversing of the carriage, and thereby affords the necessary time for backing off.

After the carriage has run out, the retrograde rotation of the spindles for backing off the yarn is performed in the following manner:—A ratchet wheel T, fixed on the grooved shaft M, is with its shaft turned by a vibrating lever click *u*, acted upon by a rotary cam or wiper *v*, on the shaft R; the extent of rotary movement given to this ratchet wheel T, and its shafts, will depend upon the extent of depression given to the lever click *u*, which is to be reduced as the cop fills, according to the quantity of backing off movement required by shortening the extent of the wiper *v*. The wiper *v*, is formed by a bolt sliding through a box or collar on the cam shaft, and this bolt is acted upon by a screw behind it,

the head of which screw has its edge cut with ratchet teeth.

As the cam shaft goes round, carrying this wiper, one of the teeth of the edge of the screw-head is brought against an oblique tooth or small click, fixed on the frame, which turns the screw by slow degrees, and by that means the length of the wiper will become gradually shortened, and consequently the extent of depression given to the lever by the wiper as it goes round will be in the same proportion diminished. At this time, that is, during the backing off, the clutch *q*, being withdrawn from the wheel H, the shaft M, is enabled to turn freely such portion of a rotation as may be given to it by the depression of the lever click acting upon the ratchet T; which movement is communicated through the bevel wheels N, to the longitudinal shafts Q, Q, and hence to the drums; and by these means is produced the retrograde rotation of the spindles to the extent required.

In order to work the faller wire by which the yarns are guided, in winding them on to the spindles, I employ a perpendicular rod, connected with the arms of the faller wire; which rod is progressively raised by a roller at its lower end, running against an inclined plane, as the mule carriage goes in. The arrangements of this part of the apparatus will be best seen in the sectional elevation of the carriage, fig. 4; but it is also shown in the plan view, fig. 1.

The faller wire is, as usual, extended along the front of the carriage, supported by bent arms or levers fixed to the horizontal shaft 3, 3: upon this shaft is also fixed a disc 4, which with the mechanism for regulating the action of the faller wire, that is, varying the left and building the cop, is shown more clearly, and upon an

enlarged scale, in the detached figs. 9 and 10. On the faller shaft is mounted, as a lever hanging loosely, the frame 5, 5, 5, which is held up by a counter-weight 6. A rim of spur teeth round the bowl-shaped pinion 7, upon the perpendicular shaft 8, acting within this frame 5, takes into a rack formed in the interior of the frame between two ledges, which ledges are pressed against by the curved surfaces of the bowl-shaped pinion, and as the shaft 8, rises and falls, the frame 5, rises and falls with it. At the lower end of the perpendicular rod 8, (see fig. 4) the roller 9, is mounted, which runs against the under surface of the inclined plane 10, 10, fixed on the ground under the carriage. The carriage having been run out to its extent, the roller 9, is brought to the lower edge of the inclined plane 10, by the operation of a bell-crank lever 11, the upper arm of which, by pressing upon the axis of the roller 9, depresses it.

This action of the bell-crank lever 11, is produced by a cam 12, upon the shaft R, mounted in the framing of the driving gear, which, as it revolves, forces back the rod 13, connected to the bell-crank lever 11, and thereby gives the movement to the lever required. The roller 9, having been thus brought to the lower side of the inclined plane 12, as shown at fig. 4, the carriage is then made to run in by the following means:—

The rotation of the cam 14, on the shaft R, before described, now causes the lever which it acts upon to throw the sliding clutch 11, into the clutch of the pulley X, when, by means of a band leading to the pulley Y, fixed on the shaft which carries the bevel wheel Z, that pulley shaft and wheel are made to revolve, and to drive the shaft m^2, in the opposite direction of that formerly described, and, consequently, to turn the screws or worm shafts E, E, the reverse way,

which will traverse the carriage inward. As the carriage runs in, the roller 9, acting against the under side of the inclined plane 10, 10, allows the perpendicular rod 8, to rise gradually, and with it the faller apparatus; by which means the faller wire is made to guide the yarns in a spiral curve as they wind on the spindle.

In laying the yarns upon the spindle so as to form the cop bottom, it is necessary, as the operation proceeds gradually, to increase the lift; that is, the altitude of the coils upon the spindles, and also to reduce the extent of the arc in which the faller wire shall move, for the purpose of laying the successive coils higher up the spindles. This is done by the following means: namely, by raising the bowl pinion 7, higher up its rod 8, and by shifting in the frame 5, nearer toward the shaft 3. To the upper part of the bowl pinion 5, a wheel 15, is affixed, which wheel has ratchet teeth; and to one of the supports of the faller shaft 3, and immediately over the edge of the wheel 15, there is attached a horizontal arm 16, which has oblique teeth, every time that the rod 8, is lifted, which is done by the counter-weight 6. When the carriage has run in, the teeth of this wheel 15, comes in contact with the oblique teeth of the arm 16, which, consequently, gives to the wheel 15, and to the bowl pinion 7, affixed to it, a small portion of a rotary movement; and by a succession of these movements, the bowl pinion is progressively raised up the rod 8, by means of the left-handed screw-thread near its top, and also moved forward in the rack of the frame 5, towards the shaft 3.

This movement of the bowl pinion 7, goes on until it has passed through all the teeth of the rack in the frame 5, and has arrived in the position shown by the dots in figs. 9, and 10, at which time the cop bottom

will have been completely formed. It will now be seen that on the carriage having run out, the descent of the rod 8, as described, will depress the frame 5; and the edge of this frame bearing against a stud or pin fixed in the side of the disc 4, will cause the faller shaft 3, and with it the faller wire, to be brought down into the position shown in fig. 10, so as to guide the yarns on the spindles at the lower part of the cop bottom.

The cop bottoms having been formed, the frame 5, must be still raised, in order to regulate the descent of the faller wire in building up the cop; and this is done by causing the bowl pinion 7, and wheel 15, to continue moving up the rod 8, by the means before described. For the purpose of enabling the pinion 7, to act in a rack of the frame 5, at whatevere levation the frame may stand, each tooth of the rack is attached to the frame by a centre pin, by which they are enabled to turn into any position into which the action of the pinion may have a tendency to force them.

In order to wind the yarn on to the spindles as the carriage runs in, a worm on the longitudinal shaft m^2, (see fig. 1,) acting in the teeth of a pinion on the short transverse shaft o, causes that shaft to revolve, and with it the toothed snail and its wheel 17, which are connected together, and locked to the shaft by a spring click 14, shown in the elevation of the driving gear at fig. 5. This winding-on apparatus will be best seen in the detached horizontal fig. 11, and elevation fig. 12, which are drawn upon a larger scale. The teeth of the snail 17, take into an intermediate wheel 18, which drives the pinion connected on the small transverse 19, by a ratchet click. Upon this shaft a wheel 20, turns loosely, which wheel has a cylindrical box 21, attached to it; the wheel 20, and box 21, being made to revolve with the

shaft 19, by means of an apparatus which holds the box and the shaft together merely by friction.

This friction apparatus is represented within the box 21, at fig. 13, and in the side elevation at fig. 14, where the box and the wheel are shown in section. Two arms 22, 22, are, by means of a collar or boss, made fast to the shaft 19, and through these arms the T-formed spring pieces 23, 23, slide. At the extremities of these springs there are friction rollers, which are pressed by the springs against the internal periphery of the box 21, with any desired force by means of adjustable curved wedges or cams 24, 24, mounted loosely on the shaft 19. These curved wedges are affixed to the face of a ratchet wheel 25; and when the wheel with the curved wedges is adjusted so as to give the desired tension to the springs, it is held fast in its position by a spring click attached to the interior of the box 21, the point of which takes into the teeth of the ratchet.

It will now be seen that rotary motion being given by the longitudinal shaft m^2, to the train of wheels and pinions last described, the wheel 20, by taking into the now unclutched wheel H, on the main shaft G, will drive the wheel I, on the shaft M, and thereby give the rotary movements to the pinions and shafts N, O, P, and Q, by which the spindles are driven to wind on the yarns.

During such running in of the carriage, the snail 17, makes about half a revolution in the direction of the arrow in fig. 12; and at the commencement of forming the cop bottom, the teeth of the snail begin to act at the point marked 1, upon the carrier or connecting wheel *q*. As, however, the forming of the cop bottom proceeds, the speed of the spindle at the commencement of winding on the lower coils of the yarn requires to be gradually diminished, owing to the increasing

diameter of the cops, which is effected by the following means:—A cam near the end of the shaft R, (see fig. 5,) as that shaft revolves, acts upon the tail of a lever 2, which lever has two arms extending upwards: the upper arm of this lever rising, lifts the spring click 14, out of the teeth of the wheel 17, and so releases it; while the lower arm of the lever acting in the teeth below, in rising, drives the wheel and its snail one tooth backward. In this way, by the successive action of the lever 26, the snail will be made to retrograde; and the point of the snail, at which the driving of the wheel 18, is to commence, will, at every successive traverse of the carriage, be removed along the convolute curve of the snail nearer to the centre, until the cop bottom is formed. The axle of the carrier or connecting wheel 18, being supported in curved slots in its standard, descends by its gravity as the periphery of the snail recedes from it, and thus continues in gear with the teeth of the snail in whatever position. The teeth on the periphery of the wheel 17, beyond the required point, are removed, in order that the lever 26, in rising, may no longer act upon it; hence as the shaft, with the spring click 14, performs its semi-rotation, the snail will be made to act from its centre upon the wheel 18, and to give to the spindles the same increasing speed until the cop is built; and as the snail has a greater speed than is necessary for winding on the first and last coils of the cop bottoms, the friction apparatus which connects the wheel 20, to the shaft 19, will relieve the gear, and give way when drawn with any extraordinary tension.

My improvements in the throstle consists, in the first place, in the peculiar construction of flyer, shown at fig. 15, in which the arms *a, a,* are inserted into a T-formed piece *b, b, b,* of cast-iron or brass, through the

middle of which a perpendicular aperture is made for the spindle *c*, *c*, to work in, as shown at fig. 16. The lower end of the spindle is supported in a step-piece *d*, shown detached in plan and elevation at figs. 17, and 18. A wharve or whirl *e*, is cast with or fixed upon the stem of the flyer, by which it is intended to be driven when mounted in the throstle frame. The bobbin *f*, runs loosely upon the upper part of the spindle bearing upon the disc. As the flyer turns when twisting the yarns, the drag for winding on to the bobbin is produced by the friction of the bobbin upon the spindle and its disc; but as this drag would be too great when spinning yarns of fine numbers if the spindle remained stationary, the friction of the flyer itself, as it revolves, carries the spindle round with it, and so relieves the drag.

In order to temper the drag, to suit yarns of various numbers, I employ a moveable step-piece *d*, with several conical holes of different depths, into one of which holes I introduce the lower end of the spindle. This step-piece is attached to the copping rail by a pin passed through a slot, and it is held by a small spiral spring underneath, which allows the step-piece to be slidden, so as to bring any one of the holes under the end of the spindle. Thus, by the employment of these conical holes of different depths, I obtain with the utmost readiness a greater or less amount of friction on the foot of the spindle, and so regulate its velocity compared to that of the flyer, as to enable me to spin yarns of different numbers, and also correct the irregularities of indifferent bobbins, without the trouble of altering the washers.

Fig. 19, is a front elevation of a throstle frame on my

improved plan: *a, a, a, a,* are the bobbins from whence the rovings proceed to the drawing rollers *b, b*; which are so arranged, that the yarns may pass perpendicularly from the front rollers down to the spindles, the bearings for the front rollers having right-angled bushes of brass inserted into the stands. The flyers are mounted in bearings in the horizontal rails *c, c,* and are driven by bands from the cylinder *d, d*: the spindles, as before described, pass through the stems of the flyers, and through the slip or bar *c, c,* which keeps them steady; and they are supported in the adjustable steps *i, i,* in the copping rail *e, e,* in the way already described. The movements of the copping rails are effected in the following manner. The rails are suspended by chains *f, f, f,* passed over pulleys; and the ends of the chains are attached to the lever *g,* beneath. On the screw shaft *h,* there is mounted an eccentric conical cam *l,* which, as it revolves, acts against a roller *m,* mounted in the lever *g*: hence by the rotation of the cam, which is driven by bevel gear on the upright shaft *n, n, n,* communicating with a worm *o,* on one of the spur wheels in the driving train at the side of the throstle frame, the copping rails are made to vibrate. As the cops change their forms, the action of the copping rails require to be varied; this is done by sliding the cam along its shaft: for this purpose, the screw on the shaft *h,* works in a half nut *p,* in the top of the standard *q*; and by these means, as it, the shaft *h,* revolves, the cam *l,* and its shaft *h,* are progressively carried along, so as to bring the larger circumference of the cone into operation on the copping lever *g.* In order to carry the cam back, so as to bring its smaller end to act upon the copping lever, as in the commencement of filling

the bobbins, the half nut *p*, may be raised by a lever handle, which, by withdrawing the half nut from the thread of the shaft, allows the shaft to be slidden back in its bearings.—[*Inrolled in the Rolls Chapel Office.*]

Specification drawn by Messrs. Newton and Berry.

To Charles Attwood, *of Wickham, near Gateshead, in the county of Durham, manufacturer of soda, for his invention of the art of making a certain pigment or certain pigments, by a certain process or certain processes, not previously used for such purpose or purposes.*—[Sealed 16th January, 1834.]

We give the words of the Patentee, which are as follows:—"I do hereby declare the same to consist in the application of a certain process, or certain processes, to and for the purpose and effect of extracting or manufacturing a certain pigment or pigments, which is or are, in point of fact, a kind or kinds of Prussian blue; such process or processes being hereinafter fully described and explained; but the distinguishing character or quality of my said invention doth consist in this— that such pigment or pigments are by me obtained, or made by a process or processes, which commence with, or proceed upon, the use of materials altogether different or differently produced from those which have been hitherto employed by others in the manufacture of Prussian blue, inasmuch as the prussic acid or such alkaline prussiate or prussiates as constitute essentially necessary, and the chiefly expensive constituent part or parts of Prussian blue, are or have been by them produced

or obtained by the heating or calcining of certain well known animal substances with potash or with soda; whereas I do, on the contrary, procure or make such pigment or pigments as, aforesaid, entirely without the use of any animal matters whatsoever; and by the use or means of certain alkaline solutions, lixiviums, or leys, or spent or mother liquors or leys, as hereinafter mentioned; in which solutions I have found or discovered that such prussic acid, or such alkaline prussiate or prussiates, exists or exist abundantly as a contingent product or products, and is or are capable of being extracted or precipitated in the usual state of combination with a twofold base of iron and of soda, as such pigment or pigments, or such Prussian blue.

"And I do further declare, that the aforesaid solutions and lixiviums or leys, or spent or mother liquors or leys, in which I have so found such prussic acid, or such prussiate or prussiates, to exist, are the solutions, lixiviums, leys, or runnings, or spent or mother liquors or leys, which are obtained by the solution of that kind or description of artificial soda in its first rough stage, which is manufactured by means of the calcination of certain well known customary mixtures of sulphate of soda, with carbonate of lime and carbonaceous matters or substances, such soda being usually denominated, by the manufacturers thereof, soda balls.

"But I do deem it needful to add, that I have also found that such prussic acid, or such prussiate or prussiates, doth or do exist abundantly in the solutions of such soda balls alone, as may have been made or manufactured by the use or employment of mineral coal in its raw or bituminous state, as such carbonaceous matter or substance as aforesaid, and not in the solu-

tions of such soda balls as may have been made by the use of charcoal or of coke, which sometimes are or may be used for that purpose.

"And I do further declare, that such pigment or pigments, or such kind or kinds of Prussian blue, may be obtained or manufactured from such solutions as aforesaid, which constitute a new or hitherto unused kind or kinds of prussic lixiviums or leys, by precipitating the same therefrom, by means of the addition, in proper quantities, of such kind or kinds of acids as are customarily and properly made use of for such purpose by other manufacturers of Prussian blue, preferring such of those acids as may be most cheaply and conveniently obtained, but taking care to use such acid or acids in excess; that is to say, in quantities sufficient to super-saturate or more than neutralise the alkali or alkalies that such solutions may contain; and by the farther use or addition of any proper salt or salts of iron, as also used by such other manufacturers of Prussian blue, in such quantity as may be sufficient to supply the fit proportion of such metallic base as is needful, for the due formation or the constitution of such pigment or pigments, or of such Prussian blue.

"And I declare, that such several additions of such salt or salts of iron, and of such acid or acids as aforesaid, together with any addition of alum, or of any other substance or substances which may be necessary or useful for the sake of giving greater body to such pigment or pigments, or of altering the tint or tone of colour thereof, or for any other purpose, may be made or applied, according to such rules and methods as have been found convenient and necessary in the precipitation of Prussian blue as previously manufactured.

"And I do further declare, that the pigment or pigments obtained by my process or processes from such new or hitherto unused kind or kinds of prussic or prussiated lixiviums or leys as I employ may be separated therefrom, on such precipitation as aforesaid; and may be subsequently prepared and dried, or otherwise made fit for market or for use, by all such means as are or may be found to answer in the case of Prussian blue, as ordinarily made or manufactured. But I do further declare, that, inasmuch as to proceed directly to the manufacture or precipitation of such pigment or pigments from the solutions of such soda balls would be an expensive course, in respect of the decomposition and conversion into neutral salts, by such addition of acid as aforesaid, of such large quantities of valuable alkali as the solutions of such balls contain; and also in respect of the great quantity of such acid that would in such case be required, I do recommend, as a much more eligible and profitable course, not to make or to precipitate such pigment or pigments from such solutions of such soda balls, until after the alkaline contents of such solutions shall have been previously extracted, or in a great degree extracted, either by the crystillation, as far as conveniently may be, of such soda as may be contained therein, in one or more successive crops; or by the combination of such soda, in so far as may be, with tallow, oils, or other saponifiable materials or substances, in the process or processes of making soap, or partly by both such means conjoined, or by any other suitable mode of extracting such soda, such prussic acid, or such alkaline prussiate or prussiates as aforesaid; still, as I have found remaining without material diminution in the mother liquors or leys, or spent leys from which such crop or crops of soda crystals may

have been taken, or in which such soap may have been boiled or made, except alone in cases where the solutions of such soda balls, or their alkaline contents, may have been purified from sulphur by any such process or processes as are liable to destroy, volatalize, or decompose such prussic acid, or such prussiate or prussiates as aforesaid; for I have found that such prussic acid, or such prussiate or prussiates do not exist, or not exist in quantities sufficient to admit of being profitably manufactured into such pigment or pigments, in solutions, lixiviums, leys, or runnings from soda, manufactured from such soda balls, but which may have been purified from sulphur by the processes in general use for that purpose; that is to say, by the boiling down to dryness of such solutions, lixiviums, leys, or runnings of such soda balls, and the subsequently carbonating of the caustic and the sulphuretted alkali thereby obtained by any known process or processes in what are called "carbonating furnaces," such prussic acid, or such prussiate or prussiates being wholly, or in great degree, volatilized or decomposed by or during the application of such processes; and I have further found, that such prussic acid, or such prussiate or prussiates, do remain without a sensible or material diminution in such solutions, lixiviums, leys, or runnings of such soda balls as may have been purified from sulphur for such purpose or purposes of crystalization, or of soap-making, or for any other purpose, by the application of carbonic acid gas to such solutions, lixiviums, leys, or runnings, especially if such application be made in close vessels or chambers, or without exposure to the air, as may be done by many known and easy methods of operation for that purpose; and I have also found, that such prussic acid, or such prussiate or prussiates,

do likewise remain without sensible or material diminution in such solutions, lixiviums, leys, or runnings from such soda balls as may have been purified from sulphur, by the application or use of any convenient salt or salts of iron or manganese: which modes of purification it is not necessary for me more particularly to describe, than to state that the same may be effected by careful and small successive additions of the solutions of such metallic salts, until such purification may have become complete, by means of the precipitation in the state of a metallic sulphuret or sulphurets of such precipitable sulphur as may exist in such solutions, in the states of alkaline sulphurets or hydro-sulphurets, according to such mode or modes of operation as I have formerly indicated, published, and more at large described in the specification of a patent, to me granted, under date the 19th day of October, 1833, for a certain improvement or improvements in manufacturing or purifying soda; and which said specification has been duly inrolled in his Majesty's High Court of Chancery.

"And I do further declare, that in cases where any proper salt or salts of iron or of manganese, may have been so employed to purify such solutions, lixiviums, leys, or runnings of such soda balls, and may have been used in excess; that is to say, in quantities beyond what would have been sufficient for the precipitation of the whole of such sulphur, as aforesaid; a portion of the prussic acid will also, in most or all such cases, have been precipitated or thrown down in a state of mixture with the sulphuretted precipitate, and will thereby be so far lost, at least for the present, but may be subsequently partially recovered, and made available for the manufacturing of such pigment or pigments as aforesaid, by the use of the following method or con-

trivance; that is to say, by dissolving the whole of such so mixed precipitates in any proper acid, and by using the solution of such precipitates as the metallic salt or salts, in order to precipitate such sulphur from other quantities of such solutions, leys, or runnings from fresh soda balls.

"And I do further declare, that it is by no means needful for the practice of my present invention, that the same should be used or carried on by such persons alone, as are or may be manufacturers of soda balls; but that the same may also be profitably used by any such persons as may manufacture crystals of soda, or as may manufacture soap by means of the solutions, lixiviums, leys, or runnings from such soda balls so purified as aforesaid, either by the use of carbonic acid gas, or by the use of salts of iron or of manganese, or by both methods jointly; provided only, that such persons may be able to obtain or to procure such mother leys, or such spent leys or liquors as may have been so used in the manufacture of soda or of soap, on terms sufficiently low for that intent or purpose.

"And I do finally declare, that such solutions, lixiviums, runnings, or leys, or spent or mother liquors or leys as do contain such prussic acid, or such prussiate or prussiates, are capable of being used in order to afford or yield such pigment or pigments as aforesaid, by modes of operation which may be much varied from the course and practice which I have above described; and do preferably recommend, as, for instance, that such pigment or pigments may be made in equal quantities, although not without some difficulty of equal quality, and in no case with equal economy, by being precipitated from such solutions, leys, or runnings, or spent or mother liquors or leys, without any previous purifi-

cation from such sulphur as aforesaid; or for further example, such pigment or pigments may be made by using means well known to chemists for the previous separation of such prussic acid, or of such prussiate or prussiates, from such solutions, lixiviums, leys, or runnings from such balls, or spent or mother leys or liquors as may, as aforesaid, respectively contain them; and by the subsequent application of such so separated prussic acid, prussiate or prussiates, to the formation of such pigment or pigments. But, that I do consider all such varied modes of operation as properly included within the scope and meaning of my patent for the present invention, which I do hereby declare to consist in essence or in principle, in the process or processes of making or extracting such pigment or pigments as aforesaid, by the use of such prussic acid, or such prussiate or prussiates as may exist in the solutions, lixiviums, leys, or runnings, and in the spent or mother leys or liquors of such soda balls as I have hereinbefore specified, by whatsoever known or profitable modes of operation the aforesaid solutions, which contain such prussic acid, or such prussiate or prussiates, may be made available in manufacturing such pigment or pigments as aforesaid.—[*Inrolled in the Inrolment Office, July* 16, 1834.]

To WILLIAM CROFTS, *of Lenton, in the county of Nottingham, framesmith, for his invention of certain improvements in machinery for making lace or net, commonly called bobbin-net lace.*—[Sealed 23d February, 1832.]

THE Patentee describes his invention as applying to that kind of machinery for making bobbin-net lace,

called in the trade *double tier*, *circular bolt*, or *circular comb machinery* (that is, in which two tiers or ranks of bobbin and carriages are worked on circular bolts or circular combs); by the agency of a driving bar behind and before the ranks of carriages; and by *locker bars*, with double blades, acting upon the tails of the carriages under the circular bolts or combs, called, in the trade, Morley's principle.

It is well known, that by the vibratory action of the driving bars, the bobbin carriages in these machines are forced in ranks from the back and front, toward the middle of the machine; and that by the reciprocating rotary movements of the locker bars below, the carriages are further passed from the back to the front series of combs or bolts, and *vice-versa*, by the blades of the locker bars, or by fluted rollers in place of the locker bars.

The construction and operation of these machines are so well understood by lace-makers, that it will be unnecessary for us to follow the Patentee in his laborious detail of movements, the mechanism for crossing, and shogging, and twisting, and traversing the bobbins to produce the meshes of the net: it will be enough to say, that the present object is to make breadths of net with selvages in these machines; that is, to make such divisions in the broad sheet of net, as shall allow of its being separated into distinct strips, or narrow breadths, as ribbons, with perfect edges or selvages.*

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* This object has been readily effected in the Levers, and some other constructions of lace-making machinery; but in the ordinary circular bolt and circular comb machines, worked by locker bars or fluted rollers, which are the most rapid of any in their production; it has been found impracticable to produce breadths

Plate II., fig. 1, represents in partial section the operative parts of a circular bolt machine, with double-bladed locker bars; and in which figure the present improved parts are added: *a*, shows the situation of the front range of circular bolts or combs; *b*, the back range; *c*, and *d*, are the double tier of bobbins and carriages, in one of which ranges there must be one bobbin more in number than in the other; *e*, is the front driving bar, *f*, the back driving bar, which, by vibrating, strike against the carriages *c*, and *d*, and cause them to slide to and fro on the circular bolts *a*, and *b*. The front locker bar, with its two blades, is shown at *g*, and the back locker bar at *h*. These bars have reciprocating rotary movements on their axes, for the purpose of causing their blades to strike against the tails of the bobbin carriages, in order to pass them through the warp threads in the middle.

The evolution and the mechanism for effecting these movements, and also the shogging or lateral movements of the circular bolts, are well understood, as causing the threads from the bobbins to cross each other, and form the tops and bottoms of the meshes, and by twisting round the warp threads proceeding from the roller *i*, through the guides *j*, *j*, to produce the sides of the meshes; the carriages being, by these means, made to move in zigzag directions, and to travel through the whole series of front combs or bolts in one direction, and of the back combs or bolts in the opposite direction.

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with selvages, without some modifications and peculiar appendages. Modes of effecting this have formed the subjects of patents granted to William Henson, in December, 1832. See vol. iv. p. 105 of our present conjoined series, and March, 1833. See vol. v. p. 297.—Ed.

If these movements of the entire ranks or tiers of bobbins and carriages were uninterrupted, the bobbins would each, as they severally arrived by their zigzag course at the ends of the ranges of bolts or combs, pass over, and return along the opposite range, forming a finish to the meshes, or a perfect selvage at each of the outer edges of the broad sheet of net, by twisting the bobbin threads round the outer warp threads. If, however, one of these bobbins and carriages were removed from the front range of bolts or combs, so as to leave an opening in the series of bobbins, an interruption would take place in the formation of the meshes of the net at those places where the bobbin was wanting. If single bobbins were withdrawn from the range in several places, the same interruption would take place in the formation of the connecting meshes opposite to those blanks; and the broad sheet of net would be separated at those parts into strips or ribbons, technically called "*breadths*," as the bobbins, on their severally arriving at the end of the intended breadth, would become what are called "*turn-again bobbins;*" that is, they would pass over to the opposite range of bolts or combs, and travel in the reverse direction, forming selvages round the warp threads at those parts of the sheet of net, and, consequently, separate it into strips.

As, however, it is necessary that the several narrow strips of lace so produced should be connected together, and made to form one broad sheet, additional bobbins, as *k*, called "*whipping bobbins*," are placed in the back combs or bolts opposite to each of these spaces, in order to be occasionally brought into operation, merely to carry a single thread round the two selvages, for the purpose of whipping or lacing them together.

These whipping bobbins *k*, are required to be held

back when the range or tier of bobbins *d*, are driven by the bar *f*, toward the middle: to allow of which, a horizontal plate, seen edgewise at *l*, affixed to the front of the bar, has saw-gates or openings cut in it opposite to each whipping carriage; so that when the bar *f*, with its plate *l*, advances to drive the bobbin carriages *d*, the whipping bobbins *k*, remain stationary in the back parts of the combs or bolts; but when it is required to bring these whipping carriages forward also, then the saw-gates or openings in the plate *l*, are covered by a sliding piece *m*, formed as a comb, which is attached to a bar *n*, in front of the driving bar *f*, and is moved, when required, by what is termed a shogging apparatus at the end of the machine.

Thus much of the machinery, the Patentee states, is known and in use, and does not form any part of his invention, but is employed in connexion with the improved parts about to be described.

The double-bladed lockers could not be made to work the ordinary bobbins, without bringing forward the whipping bobbins *k*, with them, and entangling those carriages in the warp threads at the time of shogging the bolts or combs: neither will a locker, with double blades, allow the turn-again carriages to remain behind, when it is necessary to perform transfer; consequently, such machines have not been found capable of producing broad sheets of lace, divided into breadths. The Patentee, therefore, proposes to overcome this difficulty, by the employment of forked arms or levers *p*, *p*, called pickers, which are employed for pushing back the carriages of the turn-again and whipping bobbins preparatory to shogging the bolts or combs.

The series of pickers *p*, are fixed upon horizontal bars *q*, *q*, which turn upon pivots, hanging in bent

levers *r, r;* the lower ends or longer arms of these levers being acted upon by a cam-wheel, or some other suitable contrivance, at such times as it may be necessary to raise and throw back the pickers, as shown by dots.

By thus raising the pickers *p, p,* the turn-again and also the whipping carriages are driven back in the bolts or combs, after the double-bladed locker bars have acted upon them; and at the same time that the pickers rise up, the sliding plate *m,* on the top of the bar *l,* moves laterally, for the purpose of throwing open the recesses, or saw-gates, into which the whipping bobbin carriages are thereby allowed to retreat.

As soon as the outermost blade of the locker has passed clear of the teeth of the carriages, the pickers fall from their elevated position, and allow the turn-again carriage to be operated upon in the usual manner. Attached to the back locker bar *h,* is an extra blade *s,* the object of which is to present itself against the tooth of the whipping carriages after the pickers have retreated, and thereby prevent it from falling by its own gravity between the wharp threads at the time of shogging.

The second head of this invention, consist in applying certain curved wheels or cams, acted upon in the usual manner to this machine, whereby the outermost blades of the lockers are made to act both as single and double-bladed lockers; that is to say, at every time of performing turn again, the said blade having passed one division of carriages into the opposite combs, will return for the other division; but after the transfer has been performed, the blades will act in the usual manner of a double-bladed locker.

There is no intelligible explanation of the mechanism by which this second head of the invention is to be brought into operation; and, indeed, the whole appears

to be described in a very unsatisfactory, and, in our opinion, impracticable manner: the subsequent patent, therefore, which follows this, we consider to be a detailed explanation of the above invention, with some slight variations.—[*Inrolled in the Rolls Chapel Office, August*, 1832.]

To William Crofts, *late of Lenton, but now of New Radford, both in the county of Nottingham, framesmith, for his invention of certain improvements in certain machinery for making lace or net, commonly called bobin-net lace.*—[Sealed 18th December, 1832.]

After alluding to his former specification (see the preceding), and reciting its objects, the Patentee proceeds to say, "my present improvements consist in other means, hereinafter described, besides those described in my said former specification, for producing the same result of making breadths of bobbin-net lace, by rotatory machines, with double-bladed lockersth; at is to say, by detaining those carriages which are called turn-again carriages and whipping carriages, so that they will not be passed between the warp threads along with the other carriages, whenever it is requisite for the making of breadths that they should be so detained. In my former specification, aforesaid, certain parts are described, which are called pickers; they are for the purpose of so detaining the turn-again carriages, the said pickers being fastened to two horizontal bars, which are described as being so mounted at the ends of lever arms, as to be capable of being raised up parallel to themselves in order to elevate the pickers, until their upper ends come in contact with

the teeth of those turn-again carriages which are opposite to the whipping carriages. I have since found that it is not necessary to raise up the bars as there described, but that the said bars being mounted on suitable pivots, which are properly fitted into bearings fixed to the framing of the machinery beneath the locker bars, will be capable of giving the requisite motion to the pickers which are fixed to the said bars, by merely turning the same about their axes of motion, in like manner as the locker bars are turned about their centres of motion. By such turning motion of the picker bars, the upper ends of the pickers will be caused to describe arches of circles about the said axes of motion, and will move in those arches in a suitable manner, to bring those upper ends into contact with the teeth of the turn-again carriages which are opposite to the whipping carriages; and then, by continuing the motion of the pickers after such contact is made, they will act against the said teeth, so as to remove those turn-again carriages so far away from the warp threads, that both the blades of the back locker in their turning motion will miss the teeth of those turn-again carriages, and permit them, along with the whipping carriages, to be retained behind in the back combs, when the other carriages are passed between the warp threads into the front combs. By thus avoiding the raising up of the bars to which the pickers are affixed, the action of my former improvement is simplified." Here follows a particular description of the manner in which the machinery operates; which will be clearly understood by our description of the former patent.

"Another part of the present improvements is to connect the combs together at their extremities close to the warp threads, by means of small extra tangs *t*, *t*,

figs. 2 and 4, which project downwards from those extremities, and are run together with lead. The said extra tangs *t*, at the extremities of the combs, are an improvement which is applicable in conjunction with any of the modes described in my said former specification, or in this present specification, of detaining the turn-again carriages and whipping carriages from passing along with the other carriages between the warp threads, whenever it is requisite for the making of breadths that they should be so detained.

"Another part of my present improvements relate to the mode which is secondly described in my said former specification for making breadths of bobbin-net lace, in double tier, circular bolt, or circular comb machines, which have double-bladed lockers, and which are actuated by rotative motion: which present improvements on the aforesaid mode consists in forming and applying the revolving cams or curved wheels, whereby the said double-bladed lockers are put in motion in such manner, as that at every time when the turn-again carriages are required to be transferred from one division of the carriages to the other division, and thereby to be detained from passing between the warp threads, along with the carriage of the first mentioned division, those portions of the curved circumference of the said cams which then come into action, will cause the said double-bladed lockers to turn back immediately after having let one division of carriages pass, in order to bring the same blade thereof which acted last to act again upon the teeth of the next division of carriages, to lock them after their predecessors have passed; that is, in the same manner as the blade of a single-bladed locker does commonly act against the teeth of both divisions of carriages in succession, but which is a dif-

ferent manner from the usual action of double-bladed lockers, wherein, after one blade thereof has allowed one division of carriages to pass, the locker pauses for a moment, and is turned forwards in the same direction, in order that its other blade may lock the other division after the preceding division has passed.

"In my aforesaid former improvement, it was the outermost blades *a*, and *d*, of the double-bladed lockers which were thus caused to act twice in succession, in order to lock the teeth of both the succeeding divisions of carriages at every time of performing the turn-again; but, according to my present improvements, it is the innermost blades *b*, and *c*, which are so caused to act twice in succession."

This head of the invention is exhibited in fig. 2, reference being had to the alphabetical characters, the numerical characters referring to the next division of the specification.

When both of the carriages have been locked up into the back combs *k*, by the innermost blade of the back locker *e*, acting against the back teeth *f*, of the front division *g*, of carriages, the locker *e*, is turned down with the usual motion of a double-bladed locker, sufficiently to allow the said teeth to pass over its blade; and then, in the usual mode of working a double-bladed locker, it would remain motionless, until it was required to lock up the second division *h*, which it would do by turning only a little backwards, and taking the back teeth of that division with its other blades; but, according to the present improvement, after the locker *e*, has been turned down, as aforesaid; and the instant after the teeth of both divisions of carriages have, by the action of the back driving bar *i*, been passed clear over the edge of the blade *c*, then, instead

of the back locker remaining motionless, it is turned quickly backwards or upwards so much as to bring its same blade, which acted at the last time of locking, into a proper position to act over again at the next time of locking; by then taking the back teeth of the second division of carriages, after the usual manner of single-bladed lockers, and during the first mentioned turning-down motion of the back locker, in order that its blade may allow the teeth to pass over its edge, its other blade will come to act reversely against the inside of the front teeth of the whipping carriage *l*, so as to push those carriages together with the turn-again carriages a little forwards in their combs, and enter the latter between the warp threads; all which is a needless motion, because the turn-again carriages and whipping carriages ought to have stood still in their combs; but the said needless motion can do no harm, because when the locker is turned backwards, in preparation for locking the next time by its blade *c*, that blade will take the back teeth of the turn-again carriages, and draw the same out from between the threads at the same time when the carriages *h*, of the back division are locked up by that blade *c*, acting against their teeth.

The front locker is to be actuated in a similar manner when both divisions of carriages are in the front combs, and the turn-again is to be performed by the transfer of the turn-again carriages from the back division to the front one.

The cam by which the front locker is actuated, is suitably shaped for turning that locker, so as to carry its outermost blade *a*, upwards out of the way of the front teeth of the turn-again carriages *n*, in order that the same may be brought to range with the teeth *o*, of the front division, with a quick backwards motion,

immediately after it has been acting with its other blade to lock the other division of the carriages, and has turned down so much as to let the teeth of the carriages pass; wherefore, at the succeeding time of locking the same blade, will repeat its action on the teeth *o*, of the front division of the carriages, after the usual manner of single-bladed lockers.

To produce the aforesaid effects, the cams for actuating the lockers should be of large size, and should make one revolution for every row of complete meshes of net which is made by the machinery, being the same period wherein the revolving wheels for actuating the point bars are usually turned once round; and two distinct cams should be employed, one to give motion to the front locker, and the other to the back locker. The form of the two cams will be very similar; but they must be so applied, that when those parts of the circumference of one cam are in action, which are to give the locker to which it belongs its backward motion, as aforesaid, in order to cause it to act in the manner of a single-bladed locker, the corresponding part of the other cam will not be in action; but instead thereof, those parts of its circumference will be in action, which will cause the locker to which that other cam belongs to act in the proper manner of a double-bladed locker. The form of the said cam is represented at fig. 3.

Those spaces between the combs, wherein the whipping carriages *l*, and turn-again carriages *n*, are lodged, should either be closed together a little, or else springs should be inlaid into grooves or cavities in the bolts or combs at those places, in order to retain the whipping carriages and turn-again carriages from moving in such spaces by their own weight, at the time when they are left loose therein, in consequence of the blade of the

locker quitting the teeth of those carriages, when the said locker is caused to act in the manner of a single-bladed locker; or, instead of springs in the combs, it will be better to employ stops or holders to retain the carriages from moving in the combs. The said holders are very similar to the pickers hereinbefore described; viz. they are small stems fixed on a horizontal bar, and projecting upwards therefrom opposite to every place where there are whipping carriages in the row of bolts or combs; and the said holders are applied beneath the comb bars in the same situation as the pickers, so that their extremities can be made to rise upwards in the way of the turn-again carriages, to prevent the same passing between the threads and entering the opposite combs.

A set of back pickers, and a common double-bladed locker, may be applied beneath the back combs, in order to perform the turn-again by the aid of those pickers, in the manner described in my former specification; and beneath the front combs of the same machine a double-bladed locker may be applied, having its two blades farther apart than usual. The object in placing these blades further apart than usual is, that the outermost blade, when acting reversely, may miss the edges of the turn-again carriages, and prevent them from being propelled into the opposite combs, so as the said locker may act in the usual manner of a double-bladed locker, but with a suitably increased extent of turning motion, whilst the blades thereof are drawing out the carriages from between the warp threads into the front combs; but the same locker will act in the manner of a single-bladed locker by its innermost blade alone, whenever it is required to detain the same carriages as they are going through from the front combs in a direction away from the said front locker.

In this case, the back pickers may be raised up by an extra motion to that described in my aforesaid former specification, by which they perform the turn-again action in the front combs, in order that they may, by such extra motion, serve as holders or stops, in the manner hereinbefore described, and prevent the turn-again carriages from going backwards by accident into the back combs.

It is not essential that the cams which are to actuate the said lockers with their blades unusually far apart, according to this part of my present improvements, should make only one turn, as hereinbefore directed, whilst a row of complete meshes of net is worked; for the said cams may be fixed on the same axis as the driving cams and locking cams of Morlay's machines are usually fixed upon, and which axis makes three turns whilst a row of complete meshes is formed.

Another part of my present improvements, is to apply double-bladed lockers to rotative machines, for the purpose of making breadths of bobbin-net lace, in such a manner, that each locker bar can be let down a very little at both ends, with a movement parallel to itself, at that period of its operation, as an ordinary double-bladed locker in Morlay's machines, when the turn-again carriages are required to be transferred from one division to the other division, for the purpose of making breadths by such machines; and consequently, when the said turn-again carriages must be retained from passing between the warp threads, although all the other carriages are then passing between the said threads. For this purpose, the pivots at the ends of each locker bar, instead of being mounted in bearing sockets fixed to the framing as usual, in all lace machines having locker bars, must be mounted in bearing sockets at the ends

of short crank bar arms 1, see fig. 2, projecting out from each end of the crank axes 2, which are applied horizontally beneath the comb bars, and which are supported on pivots at each end in bearing sockets fixed to the framing, but capable of adjustment when requisite, in the same manner as the pivots of the locker bars are usually supported. Each of the said crank bar axes should be supported in the middle of its length to steady it, in the same manner as locker bars are usually supported in the middle; and likewise, other short crank bar arms should be affixed to the middle part of the length of the crank bar, to sustain the middle part of the locker bar where necessary, in order to prevent it from bending. The crank bar axis at one end, or both ends of each axes must be connected by a joint 3, with an upright link 4, which goes down to a lever below, and is jointed thereto. The said lever moves upon a fixed centre pin 5, at one end; and the other end has a roller 6, to bear upon the circular circumference of a cam (not represented in the drawing), but which may be fixed on the usual axis for those cams which actuate the points, so that the said cam will make one turn for every row of complete meshes which are worked by the machinery. A notch is cut out in one part of the circular circumference of the said cam, to allow the roller to drop suddenly therein; and that sudden dropping motion occasions the locking bar to descend so far down, as to remove its blades quite out of the reach of the teeth of the carriages. The said drop of the back locking bar is to take place at that period of the ordinary course of its working as a double-bladed locker in Morlay's machines, when it arrives in the position represented in fig. 2. Both divisions of carriages having been recently locked out into the back combs *k*, by the

innermost blade *c*, acting against the teeth of the front division, and the locker being in the act of turning down to release the teeth of the front division, as the carriages are driven forwards by the back driving bar *i*; but the turn-again carriages *n*, which were before included amongst those of the front division, and the whipping carriages *l*, which were before included amongst those of the back division, are required to stand still in the combs, that they may be transferred from one division to the other; and it is to avoid disturbing their teeth by a reversed action of the outermost blade *d*, of the locker, as it continues to turn downwards, that I cause the aforesaid dropping of the locker to take place, according to this part of my present improvements; for by so dropping whilst the locker is turning further downwards, its outermost blade *d*, will pass clear beneath the said teeth of the whipping and turn-again carriages *l*, *n*, without touching the said teeth; and after so passing beneath them, the locker is suddenly lifted up again to its original and proper height, but with its outer blade *d*, at the opposite side of the said teeth; that blade being then in a proper position to lock the teeth of the back division of carriages *h*, at the next succeeding time of locking, when the turn-again carriages *n*, will be included in their spaces along with those of the back division.

Another part of my present improvements, is to apply the outermost blades of double-bladed lockers in rotative machines, for the purpose of making breadths in such manner upon their locker bars, that the said outermost blades will be capable of folding down towards or against the innermost blades of the same locker bars, whereby the edges of the said outermost blades, when so folded down, will not reach out far enough from the

centres of motion of the locker bars to intercept the teeth of the carriages. The said outermost blades are to be so folded down out of the way of the teeth of the turn-again and whipping carriages, at that period of the ordinary operation of double-bladed lockers in Morlay's machines, when the turn again is to be performed for the purpose of making breadths, and when it is required for that purpose to retain the turn-again carriages from passing between the warp threads along with the other carriages which do then pass. This manner of applying the outermost blade is represented in fig. 4. The other, or innermost blade *a*, of the same double-bladed locker, is fixed fast to the flat side of the square locker bar *b*, so as to project out therefrom in the usual manner of a single-bladed locker. A groove is excavated in the ordinary locker bar *b*, along the outermost and uppermost angle thereof, and extending nearly all the length of the bar *b*, from end to end: that groove is to receive a small round bar or axis *c*, which has the outermost blade *d*, projecting out from it; and the round bar *c*, is so fitted into the said groove in the bar *b*, as to be capable of turning round therein in the manner of an axis, with a sufficient extent of turning motion either to place the acting edge of the outer blade *a*, at its usual and proper distance from the centre of motion of the locker bar *b*, and also from the edge of the innermost blade *a*; or else to fold the said outer blade *d*, down towards and against the innermost blade, in order that the acting edge of *d*, may retreat nearer towards the centre of motion of the locker bar *b*, so as to get quite out of the reach of the teeth of the carriages. The round bar *c*, is supported from bending by being lodged in the groove in the locker bar *b*, being accurately fitted therein at different places in its length, and secured in its place by

suitable clasps, which are applied over the round bar *c*, at each of those said different places along its length: the ends of the clasps *e*, pass through openings which are cut out through the folding blade *d*, near to its axis *c*; and the said clasps are fastened by screws to the underside of the locker bar *b*. The pivots at the two ends of this kind of locker bar *b*, on which it is suspended in the usual manner, are just as usual, and, as shown by the dotted circle; for the round bar *c*, does not extend quite so far as the ends of the locker bar *b*, and does not, therefore, interfere with its pivots. At each end of the round bar *c*, a short arm *f*, projects outwards therefrom; and the end of the said arm stops against a corresponding stop which is fixed to the underside of the locker bar *b*, and projects out therefrom. These parts are so adjusted, that when the said arm *f*, is kept in contact with the said stop, the two blades *a*, and *d*, will stand at their proper distance, apart from each other suitably for operating in the ordinary manner of double-bladed lockers in Morlay's machines; and the said lockers are actuated by the usual rack and pinion, or lever-work, levers and cams, with all the same turning motions as are usually given to the double-bladed lockers in Morlay's machines, until that period of their said operation, when the turn-again is required to be performed for the purpose of making breadths by such machines; and then the said outermost blade *d*, is let loose, so that it will turn about its round bar *c*, as an axis, in order to fold down and approach its acting edge so much nearer towards the ordinary centre of motion of the locker bar *b*, that the said edge will not reach the teeth of the carriages. The requisite motion of the folding-blade *d*, and its round bar or axis *c*, may be communicated in different modes; whereof one very convenient

way is represented in the figure. The short arm *f*, is connected by a jointed link *g*, with a lever *h*, which is moveable about a horizontal stud or centre pin *i*, supported by a bracket *k*, which is screwed fast to the underside of the locker bar *b*, and projects outwards and downwards therefrom; and the same racket *k*, also supports another horizontal stud or centre pin *l*, upon which a ratchet wheel and a notched wheel *m*, are mounted side by side, so as to turn round freely on the said pin *l*, whereby the notched edge of the wheel *m*, will act against a tooth *n*, which is fixed to the lever , in a suitable manner, to enable the notched wheel *m*, to depress and hold down the said lever *h*, by the circular circumference of the notched wheel *m*, until the arm *f*, is firmly pressed against the stop; and in so depressing that lever *h*, its connexion by the link *g*, and the arm *f*, of the round bar or axis *c*, of the folding blade *d*, brings that blade into its proper situation in respect to the other blade *a*, to enable the locker to act with both its blades *a*, and *d*, just as a common double-bladed locker in Morlay's machine does act; but when the proper period arrives for performing the turn-again, a driver *o*, is lifted up so high by the action of a suitable cam, that its upper end will take into one of the teeth of the ratchet wheel of the notched wheel *m*; and whilst the locker bar *b*, is turning in order to lock out both divisions of carriages by its innermost blade *a*, the said driver *o*, drives those wheels so much round about their centre pin *l*, that a notch in the wheel *m*, is presented to the tooth *n*; and then by the action of a spring suitably applied, the outermost blade *d*, is folded down as represented in the drawing, and it continues so folded down whilst the locker bar *b*, is turned down with the usual turning motion of double-bladed lockers in Mor-

lay's machine, so far that its acting edge quits the teeth of the carriages; and when, by the driving motion of the back driving bar pushing forwards the carriages in the combs, their said teeth have passed quite over the acting edges of both the lockers *a*, and *d*, and the driver *o*, is suddenly let down again by the action of its cam before mentioned; and then a claw *p*, which is connected with the driver *o*, acts in one of the opposite teeth of the ratchet wheel, so as to turn the same much further round as will carry away the notch of the wheel *m*, from the tooth *n*, whereby the sloping edge of the notch acting against the sloping edge of the tooth *n*, will suddenly depress the same with its lever *h*, and thereby raise up the outer blade *d*, into its former position, in respect to the inner blade *a*; after which, the edge of the outer blade *d*, will proceed to act as that of a double-bladed locker usually does to intercept the teeth of the next division of carriages: but note, as the turn-again and whipping carriages have remained motionless in the combs whilst the other carriages have been moved therein, the acting edge of the outermost blade *h*, will have passed beneath the teeth of the said turn-again and whipping carriages, whilst the blade *h*, was folded down with its acting edge out of the reach of those teeth; but after the blade *h*, is turned up again, as above described, the acting edge will be at the opposite side of the said teeth of the turn-again and whipping carriages, to that side whereof on which the said edge was before it was folded down.

And lastly, another part of my present improvements is to make breadths of bobbin-net lace in the aforesaid machines, in such manner that the racking motions of those threads will not be impeded by the turn-again carriages remaining inserted between the warp threads.

By this last part of my present improvements, the racking motions of the warp threads and selvage threads are so arranged, that at the time when the turn-again carriages are left in between the threads, those threads which are adjacent to the carriages will not be moved in racking, so as to entangle the threads with the teeth of the said carriages at the next succeeding time of passing the carriages; the said turn-again carriages which were so left between the warp threads will go through between the same, along with the carriages of the back division, and will be locked up therewith in the front combs by the innermost blade of the front locker, as usual in Morlay's machines.

The proper forms for the several racking wheels which will produce such racking motions of the different bars as will suit this purpose, are represented at figs. 5, 6, 7, 8, 9, and 10; and a reference to them, and the following explanation, will be sufficient to enable competent machine-makers to carry this part of my improvement into effect. Fig. 5, is the racking wheel for the front comb bar; fig. 6, is that for the front guide bar; fig. 7, exhibits the wheel for racking the front selvage thread guide; fig. 8, is the racking wheel for the front comb bar to return in the opposite direction to the other wheel. The racking wheel for the back guide bar is seen at fig. 9; and fig. 10, exhibits that for the back selvage guide bar.

There is nothing peculiar, or of new invention, in the said racking wheels, and I make no claims thereto, except when the same are used for the purpose of making breadths in circular bolt or circular comb machines with double-bladed lockers actuated by rotatory motion, as in Morlay's machines.

Having now described my said improvements, I,

the said William Crofts, do hereby declare, that what I claim as my new invention is, the several new modes, hereinbefore described, of making breadths of bobbin-net lace by circular bolts or circular combs, rotatory machines having double-bladed lockers, commonly called Morlay's machines, by detaining those carriages, which are called turn-again carriages and whipping carriages, so that they will not be passed between the warp threads along with the other carriages, whenever it is requisite for the making of breadths that they should be so detained; viz. the simplified mode, hereinbefore described, of applying the pickers in lieu of the more complicated mode described in my aforesaid former specification, dated the 22d day of August, 1832. The mode, hereinbefore described, of connecting the extremities of the combs together close to the warp threads by extra tangs cast in lead, in order to strengthen the combs and guide the pickers, if pickers are used. The mode, hereinbefore described, of causing the innermost blades of double-bladed lockers to act twice in succession, in the manner of a single-bladed locker on the teeth of both succeeding divisions of carriages at every time of performing turn-again. The mode, hereinbefore described, of placing the two blades of each locker further apart from each other than usual, for the purpose hereinbefore set forth, and causing each of the said lockers to act alternately in the manner of a double-bladed locker, to draw the carriages through the warp threads towards itself, but to act in the manner of a single-bladed locker to lock the carriages, when they are put through away from the said locker. The mode, hereinbefore described, of applying stops or holders between the ends of the combs and the warp threads, to rise up and stop the turn-again carriages,

and retain them from moving in the combs when they ought to stand still therein. The mode, hereinbefore described, of causing the locker-bars with double blades to drop down whenever the outermost blades are required to pass beneath the teeth of the turn-again carriages, without touching the same, and to rise up again immediately after having so passed. The mode, hereinbefore described, of causing the outermost blade of double-bladed lockers to fold down, so as to pass beneath the teeth of the turn-again carriages, without touching the same; and, lastly, the mode hereinbefore described, whereby the turn-again carriages, after having performed their turn-again, and having been pushed between the warp threads by a reverse action of the outermost blade of the double-bladed locker, may be allowed to remain between the warp threads whilst the same are racking, without entanglement of the threads taking place.—[*Inrolled in the Rolls Chapel Office, June,* 1833.]

To Miles Berry, *of Chancery-lane, in the county of Middlesex, civil engineer and mechanical draftsman, for certain improvements in the construction of rotary steam-engines, being a communication from a foreigner residing abroad.*—[Sealed 8th April, 1835.]

These improvements in rotary steam-engines consist in obtaining a continuous rotary motion from the interrupted rotary motions of an engine cylinder and engine shaft, such cylinder and shaft alternately performing a part of a revolution in the same direction, and giving a continuous rotary motion to a driving shaft, to which they are connected by tooth wheels and segments; that

is to say, the cylinder is made to perform part of a revolution in one direction, and give a rotary motion through its toothed wheel to the driving shaft, the cylinder turning upon the engine shaft as its axis, which at this time is stationary; and as soon as the cylinder has completed its portion of a revolution, the engine shaft is set in motion in the same direction as the cylinder has moved, and by its toothed wheel continues the same rotary motion to the driving shaft, the cylinder during the movements of the shaft remaining stationary. These movements of the engine, cylinder, and engine shaft, are effected by the pressure of the steam acting alternately upon pistons or steam stops fixed to the interior of the cylinder, and on other pistons fixed on to that part of the engine shaft which is within the cylinder, such pistons alternately becoming moving pistons and stationary steam stops one to the other, and will be fully understood by reference to the accompanying drawings and following description thereof:—

Fig. 11, Plate II., is a plan view of the engine complete, excepting that one of the slide valves, with its connecting rod, and the cover of the steam box or chamber is removed, to expose the interior. Fig. 12, is an end elevation of the engine, one of the steam chambers and slide valves also being removed to expose the other parts. Fig. 13, is a vertical section of the engine cylinder and shaft, with their steam stops or pistons. Fig. 14, is a similar representation, showing the pistons or steam stops in a different position, that is, after the cylinder and its piston has moved one quarter of a revolution: and fig. 15, is a vertical section of one of the steam chambers and slide valves, the same letters of reference being marked upon corresponding parts in all the figures: A, A, is the cylinder, the ends or caps of

which are connected steam-tight to it in any convenient manner, and both are securely mounted steam-tight upon the engine shaft C, by proper flanges and stuffing boxes B, B, so that the cylinder will be properly supported on the shaft, and may turn upon it as its axis. In figs. 13, and 14, D, D, are the pistons or steam stops of the cylinder, to which they are firmly secured; and E, E, are the pistons or steam stops of the engine shaft, upon which they are fixed steam-tight, and have proper metallic or hempen packing at their ends and sides to keep the junctions steam-tight, but which is not shown in the drawing. To one of the stuffing boxes B, of the cylinder the toothed wheel F, is securely attached; and to this wheel is also firmly bolted the ratchet wheel G; and by these means the cylinder, with its toothed wheel F, and ratchet wheel G, being securely connected together, are made to revolve round the engine shaft when the steam acts upon the piston D, of the cylinder. Upon the engine shaft C, is securely mounted the toothed wheel H, and the ratchet wheel I, so as to revolve with it when the steam acts upon the pistons E, of the engine shaft; which shaft is mounted in proper plummer boxes or bearings K, K, in the framework L, L: M, is the driving shaft, or that which receives its continuous rotary motion from the interrupted rotary motions of the cylinder and engine shaft. The driving shaft is also mounted in proper bearings or plummer boxes in the framework L, and has the two toothed wheels or segments N, and O, securely mounted upon it, which wheels or segments have teeth formed only on one half of their circumference: N, is the segment, which takes into the teeth of the wheel F, of the cylinder; and O, the other segment, which gears into the wheel H, of the shaft; and these segments are so placed

upon the driving shaft, that when one of them is in gear with its fellow toothed wheels E, or H, the other will be out of gear with its corresponding wheel, and by these means the continuous rotary motion of the driving shaft is obtained; for when the toothed wheel F, of the cylinder is in gear with the segment N, the toothed wheel H, of the shaft will be out of gear with the segment O; and when this segment is in gear with its corresponding wheel, the other segment will be out of gear with its wheel: P, P, are strong palls or click stops, which take into the notches of the ratchet wheels G, and I, and prevent the cylinder and engine shaft from turning round but in one direction, when the steam is acting upon the pistons of either the cylinder or shaft; and by thus preventing the pistons of the cylinder and engine shaft from turning backwards, cause the pistons to form steam stops or abutments to the elastic force of the steam acting upon each other. These palls or stops P, P, are mounted by joints upon strong rods or levers Q, Q, having their fulcrums at one of their ends in joints screwed into the bottom or foundation-plate of the engine; the other ends of the levers being kept up by springs and adjusting screws, which allow a sufficient motion or play in the levers for the palls to clear the ratchets of the wheels G, and I, and enter properly into contact with them, the palls being kept in close contact with the periphery of the ratchet wheels by springs pressing against them, as shown in fig. 12.

It will be seen by figs. 13, and 14, that the pistons or steam stops D, and E, divide the interior of the cylinder into four portions or chambers, R, R, and S, S. The two chambers R, R, have no communication with the others S, S; but the two first communicate one with the other

through steam channels or passages *a, a*, formed through the engine shaft; and the two latter by similar passages *b, b*, (shown by dots) also passing through the shaft, which passages alternately form the induction and eduction steam ways of the engine. Steam is admitted into the interior of the cylinder through the shaft C, which is hollow, being bored longitudinally from its extremities inwards nearly throughout its whole length, there being a small part left solid in the middle between the passages *a*, and *b*. The hollow passage of one end of the shaft communicates with the steam passages *a, a*, and that of the other end with the steam ways *b, b*; and by this disposition of the pistons and steam passages any engineer will easily understand how the chambers R, R, and S, S, may be made, by means of proper slide valves placed at the ends of the shaft C, to communicate alternately with the steam generator or condenser, or to the atmosphere; I will, therefore, proceed to describe the action of the engine, and one arrangement for effecting the change of the induction and eduction passages and the working slide valves, but which will admit of considerable variation, as the proper movements of the slide valves may be obtained in various ways: T, and U, are two chambers or boxes mounted on brackets projecting from the end frames of the engine, in which boxes the slide valves work, and are supplied with steam through the pipes *c, c*, leading from the generator: *d*, is the slide valve, working over the alternately induction and eduction passage *e*, (see the detached fig. 15,) which communicates with another cylindrical steam chamber *f*, from whence pipes *g, g*, extend to the hollow longitudinal passages *h*, in the engine shaft C. These pipes *g, g*, are closed at their

outer ends, and have slots or openings in them within the chamber *f*, and are connected steam-tight to these chambers by passing through stuffing boxes, in which they revolve, and also to the shaft *c*, by proper packing; and being fixed on the ends of the shaft, revolve with it; and they should be placed in a direct line with its axis: *i*, *i*, are the exit pipes or passages for the eduction steam, which may lead off to a condenser or to the atmosphere. Supposing the pistons of the engine to be in the position shown in fig. 3, that is, with the chambers R, R, open to the steam generator by the passages *a*, *a*, and the chamber S, S, open to the condenser or atmosphere through the passages *b*, *b*, the steam, on being admitted by the slide valve, as hereinafter described, passes along the hollow passage of the engine shaft through the openings *a*, *a*, into the chambers R, R, where exerting its expansive power against both pistons D, and E, forces the former round with the cylinder one quarter of a revolution in the direction of the arrows, that is, into the position shown in fig. 4; the other pistons E, of the engine shaft resisting the force of the steam, they being prevented from turning round the reverse way by the palls or stops P, taking into the ratchet of the wheel I. As soon as the pistons D, arrive in this position, that is, at the end of one quarter of a revolution, the steam passages are changed by the slide valve, the steam being admitted into the chambers *s*, *s*, through the passages *b*; at the same time the steam in the chambers R, R, is free to make its escape through the passages *a*, *a*, (which now become the eduction passages) to the condenser or atmosphere. The steam now exerts its expansive force in the chambers S, S; and as the pistons D, are prevented from turning back by the palls or stops P, taking into the ratchets of the wheel G,

the pistons E, are forced round in the direction of the arrow one quarter of a revolution (that is, following the pistons D,) when another change of the slide valves take place, and the passages *b*, *b*, again become the eduction passages, and the passages *a*, *a*, the induction; and the cylinder, with its pistons, is again made to move forward one quarter of a revolution, when another change in the slides takes place, and the pistons E, again moves, and so on producing alternately an interrupted rotary motion of the cylinder and engine shaft in one direction, which motion is communicated by the toothed wheels F, and H, to the working shaft, as before stated; and from its segments or wheels N, O, being only half the diameter of the wheels F, and H, the driving shaft, consequently, makes two rotations to one of the engine.

A fly-wheel should be placed on the working shaft to render its motion regular and continuous during the time the engine is on the dead points, that is, while the slide valves are changing the steam passages. The motion of the slide valves in the chambers *t*, and *u*, is obtained in the following manner: *k*, *k*, are the slide valve rods, which work through stuffing boxes and guides, and are connected at the outer ends by joints to the ends of the lever *l*, turning upon a pin or stud *m*, as its fulcrum. The ends of this lever are alternately moved outwards and inwards, thereby changing the position of the slides by cams or tappets *n*, *m*, and *n**, *m**, mounted on opposite ends of the working shaft *m*, which cams act against the ends of the sliding bars *o*, *o*, the other ends of the bars being connected by joints to the ends of the lever *l*; and thus, as the working shaft revolves, the slide valves will be moved, and change the steam passages at the proper times.

In order that the engine may be worked with the

steam expanding, that is, when the passage of the induction steam into the engine is cut off before the pistons have performed their full quarter of a revolution, the tappets *n*, *m*, and *n**, *m**, are so placed upon the shaft M, that when the larger tappet *n*, has forced one end of the lever outward, and caused the side valve at its end of the shaft to admit the steam into the engine (as seen in fig. 5), as soon as sufficient steam is admitted to the cylinder, then the smaller lappet *m**, (shown by dots in fig. 2) at the other end of the shaft coming into contact with its rod, forces the lever *l*, and slide partly back again into the position shown in the diagram, fig. 6, and cuts off the supply of steam, the slide valve covering the aperture. The steam in the cylinder then expanding, continues the motion of the shaft M, until the larger lappet *n**, comes into contact with its slide bar *o*, when its side *d*, will be brought into the position in fig. 5, and the slide at the other end of the engine, brought into the position shown in the diagram, fig. 7, that is, opening the passage *e*, to the exit pipe *i*, when the eduction steam is free to go off to the condenser or atmosphere, and these movements taking place at each end of the engine, the continuous motion is effected. As the steam does not enter the cylinder at the very moment the pistons of the shaft and engine furnish their movements, it might happen that they would perform a little more than their proper portion of a revolution; and if this should take place on the next entrance of the steam, they would have to recede, which would produce a concussion in the engine: this inconvenience is prevented by the application to each of the toothed wheels F, and H, of four projecting stop pieces *p*, *p*, *p*, *p*, which come into contact with the lever *l*, at the moment the pistons of the cylinder or engine shaft have com-

pleted their quarter of a revolution, and which are released by the movement of the lever *l*, just at the moment the toothed wheels F, and H, and their pistons are on the point of starting.—[*Inrolled at the Rolls Chapel Office.*]

Specification drawn by Messrs. Newton and Berry.

To RICHARD PHILLIPS, *late of New Kent-road, in the county of Surrey, but now of Grove-lane Hill, Camberwell, in the said county, lecturer on chemistry at St. Thomas's Hospital, for his invention of certain improvements in the process of manufacturing sulphate of soda.* —[Sealed 4th June, 1835.]

THE nature of this said invention consists in the application of sulphate of iron, in various forms (each different form of application being an improvement on the present mode), to produce sulphate of soda from common salt.

It is well known that when certain kinds of the persulphuret or bisulphuret of iron, commonly called iron pyrites, or martial pyrites, and sometimes merely pyrites, are exposed to the action of the air, and of moisture, the sulphur which the pyrites contains is for the most part, by oxidizement, converted into sulphuric acid; and the iron which the pyrites contains is also, by oxidizement, converted into oxide of iron; and the sulphuric acid and oxide of iron thus formed combining, they constitute with water a solution of sulphate of iron, copperas, green copperas, or green vitriol, with an excess of sulphuric acid, and the heaps of pyrites which are thus exposed to air and moisture for the

purpose of preparing sulphate of iron, or green vitriol, are called copperas, or pyrites' beds.

The liquor, which is yielded by the action of the air and moisture upon the pyrites of these copperas beds, is an aqueous solution of sulphate of iron, or green vitriol, with excess of sulphuric acid and this liquor.

The Patentee calls the entire liquor, meaning thereby that it contains the whole, or nearly the whole, of the sulphuric acid formed by the action of the air, and of moisture on the sulphur of the pyrites in the copperas beds, as above described.

The use of this entire liquor (on account of the large quantity of sulphuric acid which it contains), is one of the Patentee's improvements in the process of manufacturing sulphate of soda. For this purpose are taken sixty parts (by weight) of common salt, frequently called muriate of soda, and sometimes chloride of sodium, which is put into a reverberatory furnace of the usual construction, and such a quantity added to it of the entire liquor, before described, as would, if mixed with a sufficient quantity of an aqueous solution of acetate, nitrate, or other convenient salt of lead, give a precipitate of sulphate of lead, which would weigh, after proper washing and drying, about 160 parts. These 160 parts of sulphate of lead, indicating the presence of sulphuric acid equal to about fifty parts, by weight, of concentrated liquor, sulphuric acid, or oil of vitriol, and which are required for the decomposition of sixty parts of common salt, so as to convert it into sulphate of soda. The specific gravity of the entire liquor is also taken, and on future occasions, when its specific gravity is the same, or nearly so, is determined, the quantity of it to be used with sixty parts of common salt by its specific gravity alone, and without repeating the trial

as to the quantity of sulphate of lead which is yielded by a given portion of it; and the Patentee observes, that the greater the specific gravity of the liquor, the greater will be the advantages to the manufacturer.

The entire liquor and common salt being well mixed in the reverberatory furnace, I heat the mixture as usually practised in the decomposition of common salt by sulphuric acid, occasionally stirring it until acid vapours cease to arise from it. The residue of this operation is a mixture of oxide or peroxide of iron, and sulphate of soda, and usually a small, but unimportant quantity of common salt: this residue is heated in water to, or nearly to, its boiling point, in any convenient vessel; and when the water is nearly or sufficiently saturated, the peroxide of iron is suffered to subside, and the clear solution being conveyed to proper vessels, it yields, by cooling, crystals of sulphate of soda.

Having now described what the Patentee considers to be the best process for obtaining sulphate of soda by decomposing common salt with the entire liquor, he proceeds to describe another of his improvements, which consists in the use, when circumstances render it eligible or convenient, of the crystalized sulphate of iron, green copperas, or green vitriol, obtained from the entire liquor, or in any other mode, by the usual processes. For this purpose, he reduces about 150 parts, by weight, of the crystalized sulphate of iron, or green vitriol, to powder, and mixes it with sixty parts, by weight, of common salt, and heats the mixture in a reverberatory furnace, in the same manner as before described, treating the residue in the same way as already described, with reference to the residue obtained when the entire liquor is used.

Another of these improvements consists in the use of the solution remaining after the separation of the crystals of sulphate of iron in the ordinary process of making green vitriol, and which solution is termed the *mother waters*. The strength of this solution, and the quantity of it to be used with a given weight of common salt, is determined by means of the proportion of sulphate of lead, which it yields exactly in the same manner as described with respect to the use of the entire liquor. The specific gravity is also taken for the reason already stated with respect to the entire liquor, and treated the mixture and residue, as already mentioned, with regard to those processes previously described.

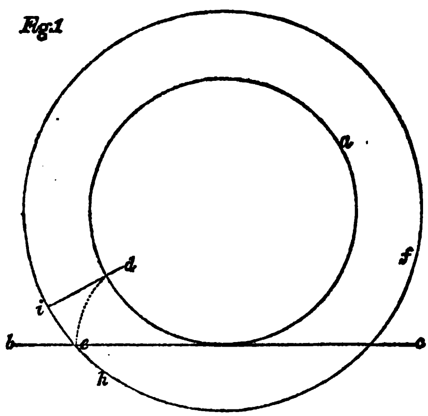
The Patentee says, "Now, whereas I claim as my invention the use of sulphate of iron (in whatever mode produced) in the process of manufacturing sulphate of soda, and whether applied in the form of crystals, mother water, or what I call entire liquor; and such my invention being, to the best of my knowledge and belief, entirely new, and never before used, I do hereby declare this to be my specification.—[*Inrolled in the Inrolment Office, 4th December,* 1835.]

To ELIJAH GALLOWAY, *of Wellington-terrace, Waterloo-road, in the county of Surrey, for his invention of certain improvements in paddle-wheels for propelling vessels.*—[Sealed 18th August, 1835.]

MR. GALLOWAY, in his specification of the above patent, states, that the object of his invention is to counteract the evils arising from the use of the ordinary

paddle-wheels, by preventing the concussion incidental to them on entering the water, and causing the floats to rise therefrom in such a manner, that they lift but comparatively little back water, and therefore do not produce so much swell in the wake of the vessel. The principle on which he constructs his wheel is that of the cycloidal curve; and in illustration, proceeds to state, that if we conceive a vessel going at a certain speed, and a circle as *a*, fig. 1, in the accompanying diagram, travelling with that vessel, and making a

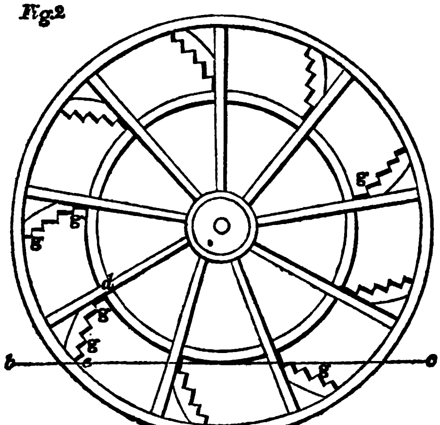
Fig. 1



certain number of revolutions in a given time, the circumference of that circle, multiplied by the number of revolutions, will give the distance, in admeasurement, that the vessel has passed over in the same time. We may, therefore, imagine this circle rolling on the horizontal *b*, *c*, (the water line on which the vessel floats); and if a point as *d*, be taken upon the circle *a*, and supposing it to start from *e*, and rolled along the horizontal line *b*, *c*, the curve *e*, *d*, will be traced by that point, which will be a perfect cycloid; and if the circle *a*, be of such circumference that its speed is equal to

the velocity of the vessel, a curved bar fitted to this cycloidal curve would be completely immersed in water, it constantly entering at the point *e*. Then, suppose the generating circle *a*, to be the boundary of the inward edges of the floats and the circle *e*, *f*, that of the outward edges, the wheel then reduced to practice will bear the form represented at fig. 2.

Fig. 2



To the cycloidal curve *d*, *e*, Mr. Galloway's float-boards are attached by any of the ordinary means. These floats, instead of being constructed in broad sheets in the usual manner, are divided into narrow separate boards. It should be here remarked, that the surfaces of the floats must be calculated as if they were on the ordinary principle, according to the power, number of strokes of the engine, and the velocity required. The floats are placed in direct radial lines from the centre, and it will readily be perceived, that very little more water will be displaced in their revolution, than that disturbed by the entrance of the first float.

The Patentee further states, that although he prefers constructing his paddle-wheels under the circumstances before mentioned, yet that advantage cannot always be conveniently obtained; for supposing the circle *e*, to be twice the diameter of *a*, it is evident that a cycloidal curve, to pass through the point *d*, would extend considerably further (say to *h*,) in the outer circle: under such circumstances, the float-boards would be a great distance apart, which he has found to be a serious defect. In this case he prefers using an approximation to the cycloidal curve, for he believes that any direction of floats, even confined to a straight line, will be an improvement on the ordinary plan, if such direction forms an angle less than *d*, *e*, to *d*, *i*, which is the ordinary line of the floats; and if the floats be mounted on a curve or a straight line, having an angle less than that of *d*, *i*, to *d*, *h*, he conceives he will not be departing from the limits of his claim of invention.

The Patentee concludes by remarking, "that since the sealing of his patent, he has been informed that Mr. Field, engineer, of Lambeth, employed paddle-wheels formed by detached narrow float-boards in a steam-vessel called the Endeavour;" a drawing of which he has exhibited in his specification, to point out the difference. (A figure of this drawing will be found in our number of December, 1835, Plate X., No. 2.) Mr. Galloway states that this wheel is entirely different from the subject of his present patent, and that he does not intend to claim the mounting of the float-boards in detached parts, unless confined to the principles laid down in his present specification..—[*Inrolled in the Inrolment Office, February,* 1835.]

In the number of our Journal above alluded to, will be found a communication from Mr. Joshua Field, in

which he has shown three modes of mounting the floats of paddle-wheels on the cycloidal principle, as used by Messrs. Maudsley, Son, and Field, and submitted by them to the Lords of the Admiralty in the years 1833 and 1835. For our parts, we cannot see the difference between the two constructions. Mr. Galloway's invention appears to be a distinction without a difference; for we can conceive no point in that gentleman's specification that will not be amply anticipated by all competent persons on reading the communication from Mr. Field.—Ed.

SCIENTIFIC ADJUDICATION.

CORNISH AND ANOTHER, *v.* KEENE AND ANOTHER.

This was an action arising out of an application in the Rolls Court, for an injunction to restrain the defendants from manufacturing certain elastic fabrics, for which Mr. Sievier, one of the plaintiffs, obtained letters patent on the 17th of January, 1833: a great number of affidavits had been filed by the parties in the Rolls contradictory of each other; and an action was undertaken to be brought by the plaintiffs, on the defendants being required to keep an account. The cause came on in the Common Pleas, before Lord Chief Justice Tindal and a special jury, on the 7th of December last. The plaintiffs' case was conducted by the Attorney-General, Mr. Sergeant Wilde, Mr. Sergeant Stephens, and Mr. Hindmarsh. The defendants, by Sir F. Pollock, Mr. Creswell, and Mr. Knowles.

The patent which the plaintiffs obtained, was specified on the 17th of June, 1834; the details of which will be found in vol. iii. p. 65, Conjoined Series, of our

Journal. The defendants, it was alleged, infringed the patent right of the plaintiffs by copying one of the objects of the specification (the third). Evidence was adduced by the plaintiffs, to prove the manufacture and sale of an imitation of the patent article by the defendants.

The pleas put on the record by the defendants were—

1st. That they were not guilty of an infringement of the patent.

2d. That the Patentee was not the first inventor.

3d. That the invention or discovery itself, at the time the patent was granted, was not a new invention, as to the public use and exercise thereof in England.

4th. That it was not an improvement in the making or manufacturing elastic goods or fabrics.

5th. That there was no sufficient specification.

A number of persons were brought by the defendants to sustain their third plea only. We need offer no remark on their evidence, beyond that after a prolonged and searching investigation of two days and a half, the jury returned a verdict for the plaintiffs.

Since the trial, Sir F. Pollock has obtained a rule *nisi* to move for a nonsuit, on two grounds.

1st. That to apply a known material made in a known manner, to effect a known object, cannot be the subject of a patent.

2d. That the mode of effecting one of the objects of the patent is distinctly pointed out in the specification of a previous patent obtained by Mr. Sievier, in 1831; and for a new trial on two grounds.

1st. That the verdict was against evidence.

2d. That since the trial, fresh evidence has been discovered in the specification of a patent, dated 14th November, 1832.

The rule was refused, on the ground of misdirection, by the judge.

We shall enter more fully into the arguments used by counsel, and the exposition by his lordship of the application of the law of patents, when the matter is brought to a conclusion.

SCIENTIFIC NOTICES.

HALLEY'S COMET.

Geneva, Jan. 4th.—Mr. J. Müller, assistant in the observatory here, again saw Halley's Comet on the night of the 31st of December. It was very faint indeed, but it made its appearance precisely in accordance with the calculation of Professor Gautier, director of the observatory. Mr. Müller directed his telescope at the minute given to the spot designated, and saw the Comet really appear, and pass across the object glass. This was on the 31st of December, at 12h. 45m. 15″ night, astronomical time, or 5h. 56m. January 1st, civil time; right ascension 16° 18′ 5″; south ascension 24° 44′.—*Times.*

This interesting body has also been twice seen since its perihelion passage, by the Rev. R. Dawes, of Ormskirk, on the 16th and 19th of January last. On the 16th R. A., 15h. 59m. 46s., south declination 27° 22′ 30″. On the 19th, the haze only gave time for a casual glimpse, R. A., 15h. 59m. 43s. South declination, 27° 22′ 42″.

As the Comet is said by Mr. Dawes to be exceedingly faint, it is hopeless to look for it with any telescope which does not considerably exceed his in power, which was a very excellent five-feet telescope, made

and mounted by Dolland. Mr. Dawes is acknowledged to be one of the most skilful and delicate measurers of minute celestial phenomena in this country. He has contributed several memoirs to the Royal Astronomical Society.

The press of matter obliges us to defer the continuation of the report of the "Commissions of Inquiry," instituted by the French Government for the regulation of duties, &c., upon foreign manufactures, to a future opportunity.—Ed. *London Journal.*

List of Patents

Granted in Scotland from 16*th June to* 18*th February*, 1836.

To William Busk, of Bankside, in the county of Surrey, engineer, for certain improvements in propelling boats, ships, or other floating bodies.—16th October.

— Joseph Henri Jerome Poittevin, of Craven-street, Strand, Middlesex, in consequence of a communication made to him by a foreigner residing abroad, for a powder which is applicable to the purpose of disinfecting night soil, and certain other matters, and facilitating the production of manure.—16th October.

— Patrick Seyton Hynes, of Paddington, in the county of Middlesex, for certain improvements in wheels, axletrees, and boxes, and an apparatus for retarding or locking carriage wheels—16th October.

— William Wilkinson, of Lucas-street, parish of St. George in the East, in the county of Middlesex, for a certain improvement or improvements in the mechanism or machinery by which steam power is applied to give motion to ships, or other floating vessels, in or through water.—22d October.

To Charles Pierre Devaux, of Fenchurch-street, in the city of London, merchant, in consequence of a communication made to him by a foreigner residing abroad, for certain improvements in smelting iron stone or iron ore.—23d October.

— William Lucy, of Birmingham, miller, for an improvement in steam-engines.—23d October.

— Joel Spiller, of Battersea, in the county of Surrey, engineer, for an improvement or improvements upon boilers for generating steam, or heating water or other fluids for useful purposes.—28th October.

— Hugh Ford Bacon, of Christ College, Cambridge, for an improved appàratus for regulating the flow of gas through pipes and gas-burners, with a view to uniformity of supply.—28th October.

— Samuel Slocum, of the New-road, St. Pancras, in the county of Middlesex, engineer, for improvements in machinery for making pins.—4th November.

— Thomas Fleming Bergen, of Fairview Avenue, Dublin, civil engineer, for certain improvements in the method of suspending and adjusting the bodies of railway, and all other wheeled carriages.—2d November.

— William Longfield, of Otley, in the county of York, whitesmith, for an improved lock or fastening for doors, and other situations where security is required.—2d November.

— Robert Jupe, of New Bond-street, in the county of Middlesex, for certain improvements in expanding tables, and also in ornamental, dessert, flower, and other stands.—4th November.

— Elijah Galloway, of Wellington-terrace, Waterloo-road, in the county of Surrey, for certain improvements in paddle-wheels for propelling vessels.—4th November.

— William Patterson, of Dublin, for an improvement in converting hides and skins into leather, by the application of matter obtained from a certain material not hitherto employed for that purpose.—4th November.

— George Edmond Donisthorpe, of Leicester, worsted spinner,

and Henry Rawson, of the same place, hosier, for certain improvements in the combing of wool, and other fibrous substances.—6th November.

To John Birkley, of High Town, near Leeds, card-maker, for improvements in machinery for pointing wire, applicable for making up cards and pins.—13th November.

— Richard Whiteside, of Ayr, wine-merchant, for certain improvements in the wheels of steam-carriages, and in the machinery for propelling the same, also applicable to other purposes.—17th November.

— John Reynolds, of Liverpool, for certain improvements in railways.—7th December.

— Samuel Faulkner, of Manchester, cotton-spinner, for an improvement in the carding of cotton and other fibrous substances, by a new application of the machinery now in use for carding cotton or other fibrous substances.—9th December.

— Miles Berry, of Chancery-lane, in the county of Middlesex, mechanical draftsman and patent agent, in consequence of a communication made to him by a foreigner residing abroad, for an improvement or improvements in the machinery or constructing of meters or apparatus for measuring gas, water, and other fluids.—9th December.

— John Houldsworth, of Glasgow, cotton-spinner, in consequence of a communication made to him by a foreigner residing abroad, for certain improvements applicable to drawing and slubbing-frames, used in the manufacture of cotton and other fibrous substances.—18th December.

— Joseph Skinner, of Fen-court, in the city of London, civil engineer, for improvements in machinery for cutting wood for veneers and other purposes.—24th December.

— John Joseph Charles Sheridan, of Walworth, in the county of Surrey, chemist, for an improvement in the manufacture of soap.—24th December.

— William Symington, of Bromley, in the county of Middlesex, cooper, for certain improvements in the steam-engine, and in the machinery and apparatus for propelling vessels by

steam, which improvements are wholly, or in part, also applicable to motive machinery of other descriptions, whether actuated by steam or by any other moving power.—31st December.

To Elijah Galloway, of Westmoreland-place, City-road, London, engineer, for certain improvements in steam-engines, which improvements are applicable to other purposes.—11th January, 1836.

— James Bullough, of Blackburn, in the county of Lancaster, mechanist, for certain improvements in hand-looms and power-looms.—11th January.

— John Malam, of Kingston-upon-Hull, civil engineer, for certain improvements in gas-meters, and in the apparatus for generating gas for illumination.—11th January.

— Joseph Whitworth, of Manchester, engineer, for certain improvements in machinery for spinning, twisting, and doubling cotton, flax, wool, and other fibrous substances.—14th January.

— William Harter, of Manchester, for certain improvements in machinery for winding, cleaning, drawing, and doubling hard and soft silk, which improvements are also applicable to machinery for winding, cleaning, and doubling thread or yarn manufactured from cotton or other fibrous substances.—15th January.

— Thomas Jevons, of Liverpool, in consequence of a communication made to him by a foreigner residing abroad, for certain improved machinery to be used in manufacturing bars or wrought iron into shoes for horses, and also into shapes for other purposes.—15th January.

— Thomas Greig, of Rosebank, parish of Bury, Lancaster, for a mode of embossing and pointing, at one and the same time, by means of a cylinder or roller, on goods or fabrics made of or from cotton, silk, flax, hemp, and wool, or any one or more of these materials, or on paper.—18th January.

— Andrew Smith, of Princes-street, Haymarket, London, for a

new standing rigging for ships and vessels, and a new method of fitting and using it.—19th January.

To John Day, of York-terrace, Peckham, in the county of Surrey, for an improved wheel for carriages of different descriptions.—20th January.

— Moses Poole, of London, in consequence of a communication made to him by a foreigner residing abroad, for improvements in Jacquard looms.—1st February.

— John Cooper Douglas, of Great Ormond-street, London, for certain improvements in making vinegar from various materials, and in making useful articles from the refuse of such materials, and also in apparatus or vessels for applying and conducting heat to liquids to be used in the manufacture of vinegar and other purposes.—1st February.

— Lightly Simpson, of Manchester, chemist, for certain improvements in the preparation of certain colours to be used for printing cotton and other fabrics.—3d February.

— John George Bodmer, of Bolton-le-Moors, Lancaster, engineer, for certain improvements in machinery for preparing, roving, and spinning cotton and wool.—3d February.

— James Brown, of Esk-mills, Pennycuick, Edinburgh, for certain improvements in the making or manufacturing of paper. —4th February.

— John Hewitt, of Rinezie, Cornwall, for a combination of certain material or materials, which, being combined or mixed together, will form a valuable substance or compound, and may be used with or as a substitute for soap.—4th February.

— James Kean, of Johnstone, Renfrewshire, for an improved throstle-flyer, or a substitute for an ordinary flyer, employed in spinning cotton, flax, hemp, wool, silk, and other fibrous substances.—12th February.

— Edmond Ashworth, of Egerton, Lancaster, cotton-spinner, and James Greenough, of the same place, overlooker, for certain improvements in the machinery used in preparing

and spinning cotton, silk, wool, and other fibrous substances. —18th February.

To Francis Moll, of Grove Lane-terrace, Camberwell, in the county of Surrey, for improvements in preserving certain vegetable substances from decay.—18th February.

— Julius Jeffreys, of Osnaburgh-street, Regent's-park, in the county of Middlesex, for improvements in curing or relieving disorders of the lungs.—18th February.

New Patents

SEALED IN ENGLAND,

February, 1836.

To John Filmore Kingston, of Islington, in the county of Devon, esq., for his invention of a new rotary engine.—Sealed 28th January—6 months for inrolment.

To William Boulnois, the younger, of Gower-street, in the county of Middlesex, esq., for his invention of an improved combination or arrangement of springs for carriages.—Sealed 30th January—6 months for inrolment.

To Stephen Reed, of the town and county of Newcastle-upon-Tyne, gentleman, for his invention of a method or invention of two improved hooks, and an improved bow for corves, baskets, buckets, and other vessels, which are conveyed, either loaded or empty, from one level to another, by being suspended and let down, or drawn up, more especially for such corves, baskets, buckets, and other vessels as are used for the purpose of letting down their contents to a lower level, or of raising the same to a higher elevation, in mines, pits, wells, shafts, quarries, collieries, warehouses, factories, buildings, dock-yards, also in and about ships, boats, and vessels, and the tackling thereof, and other works, and in general in all works and cases where cranes, common hooks, and bows are now used.—Sealed 1st February—2 months for inrolment.

To John Baring, of Bishopsgate-street, in the city of London, merchant, for certain improvements in machinery or apparatus for combing or brushing and separating wool, being a communication from a foreigner residing abroad.—Sealed 3d February—6 months for inrolment.

To Frederick Edward Harvey, of the Horsley Ironworks, in the parish of Tipton, and county of Stafford, mechanical draftsman, and Jeremiah Brown, also of Tipton, in the same county, roll-turner, for their invention of certain improvements in the process and machinery for manufacturing metallic tubes, and also in the process or machinery for forging or rolling metal for other purposes.—Sealed 3d February—6 months for inrolment.

To Edmund Ashworth, of Egerton, in the county of Lancaster, cotton-spinner, and James Greenough, of the same place, overlooker, for their invention of certain improvements in the machinery used in preparing and spinning cotton, silk, wool, and other fibrous materials.—Sealed 5th February—6 months for inrolment.

To Henry Adcock, of Stamford-street, Blackfriars-road, in the county of Surrey, civil engineer, for his invention of certain improvements in the loading and unloading of ships, brigs, schooners, and other vessels, especially applicable to the unloading of those vessels called colliers, which usually discharge their cargoes in that part of the river Thames called the Pool, near London.—Sealed 5th February—6 months for inrolment.

To Alexander Massie, of the parish of St. John, Wapping, in the county of Middlesex, engineer; Robert Morton, of the same place, engineer; William Ranwell, of Woolwich, in the county of Kent, coal-merchant; and Ebenezer Ranwell, of the same place, miller, for their invention of certain improvements in the construction of paddles or paddle-wheels for propelling of vessels, which improvements are also applicable to the construction of water-wheels for mills.—Sealed 9th February—6 months for inrolment.

To Frederick Herbert Maberley, of Bourne, near Coxton, in the county of Cambridge, clerk, for his invention of certain improved machinery for raking, scraping, and

sweeping roads or streets.—Sealed 10th February—6 months for inrolment.

To Samuel Fenton, of Fishguard, in the county of Pembroke, South Wales, clerk, for his invention of an improvement or improvements in the construction of locks and latches for doors, gates, and other useful purposes.—Sealed 10th February—6 months for inrolment.

To John Howard Kyan, formerly of Gillingham-street, Pimlico, but now of Ailsa-park Cottage, Twickenham, in the county of Middlesex, esq., for his invention of a new mode of preserving certain vegetable substances from decay, to extend only to his Majesty's colonies and plantations abroad.—Sealed 11th February—2 months for inrolment.

To Andrew Smith, of Princes-street, in the parish of St. Martin-in-the-Fields, and county of Middlesex, engineer, for his invention of certain improvements in engines for exerting power for driving machinery, and for raising and lowering heavy bodies.—Sealed 12th February—6 months for inrolment.

To Charles Schafhault, of Sheffield, in the county of York, gentleman, for his invention of an improved steam generator.—Sealed 16th February—6 months for inrolment.

To Joshua Procter Westhead, of Manchester, in the county of Lancaster, small ware manufacturer, for his invention of an improved method of cutting caoutchouc, or Indian rubber, leather, hides, and similar substances, so as to render them applicable to various useful purposes.—Sealed 16th February—6 months for inrolment.

To Michael Hodge Simpson, late of Boston, in the United States of America, but now residing in Ludgate-hill, in the city of London, merchant, for certain improvements in machinery or apparatus for heckling, or combing, and preparing hemp, flax, tow, and other vegetable fibrous substances, and also waste silk, being a communication from a foreigner residing abroad.—Sealed 17th February—6 months for inrolment.

To Joseph Lidel, of Arundel-street, Panton-square, in the county of Middlesex, professor of music, for certain improvements in piano-fortes, being a communication from a foreigner residing abroad.—Sealed 17th February —6 months for inrolment.

To William Bucknall, of Crutched Friars, in the city of London, cork-merchant, for his invention of improvements in machinery for propelling vessels, and for water-wheels.—Sealed 17th February—6 months for inrolment.

To Frederick Chaplin, of Bishop-Storford, in the county of Herts, tanner, for his invention of an improvement in tanning hides and skins of certain descriptions.—Sealed 18th February—6 months for inrolment.

To Henry Martinson Robinson, of the Minories, in the city of London, paint and varnish manufacturer, for his invention of improvements in certain descriptions of lamps. —Sealed 18th February—6 months for inrolment.

To John Barsham, of Stepney-causeway, in the county of Middlesex, oxalic acid manufacturer, for his invention of improvements in the manufacture of oxalic acids and salacetecella—Sealed 20th February—6 months for inrolment.

To Francois Peyre, junior, of St. Etienne, in the kingdom of France, dyer, now residing at the White Hart Inn, in the borough of Southwark, for certain improvements in the means of economising fuel in ships' hearths, or cooking apparatus, and of obtaining distilled water from sea water, which improvements apply to generating steam, being a communication from a foreigner residing abroad. —Sealed 23d February—6 months for inrolment.

To Churton Gray Gilroy, of Argyle-street, New-road, St. Pancras, in the county of Middlesex, engineer, for his invention of certain improvements in machinery for weaving plain and figured fabrics.—Sealed 25th February—6 months for inrolment.

CELESTIAL PHENOMENA, FOR MARCH, 1836.

D.	H.	M.	
1			Clock before the ☉ 12m. 33s.
	—		☽ rises 3h. 13m. A.
	—		☽ passes mer. 11h. 13m. A.
	—		☽ sets 6h. 33m. M.
	3	54	♃ stationary.
4	23	12	☿ stationary.
	—		Occul. γ^1 Virg., im. 18h. 4m., em. 18h. 41m.
5			Clock before the ☉ 11m. 41s.
	—		☽ rises 8h. 31m. A.
	—		☽ passes mer. 1h. 34m. M.
	—		☽ sets 7h. 42m. M.
	8	27	♃'s third sat. will em.
	18	20	♀ in the ascending node.
6	17	18	♄ in conj. with the ☽ diff. of dec. 1. 14.
	—		Occul. λ Virg., im. 15h. 36m., em. 16h. 34m.
7	12	11	♃'s first sat. will em.
9	6	40	♃'s first sat. will em.
10			Clock before the ☉ 10m. 25s.
	—		☽ rises 2h. 11m. M.
	—		☽ passes mer. 5h. 54m. M.
	—		☽ sets 9h. 32m. M.
11	2	1	♂ in conj. with ♅ diff. of dec. 0. 26.
12			♂ greatest Hel. Lat. S.
	9	5	♃'s fourth sat. will em.
	9	10	♃'s third sat. will im.
	12	27	♃'s third sat. will em.
	23	19	☿ in the descending node.
13	7	50	♃'s second sat. will em.
14	13	55	☿ in conj. with the ☽ diff. of dec. 5. 4.
	14	6	♃'s first sat. will em.
	21	52	♅ in conj. with the ☽ diff. of dec. 4. 36.
15			Clock before the ☉ 9m. 3s.
	—		☽ rises 6h. 10m. M.
	—		☽ passes mer. 10h. 46m. M.
	—		☽ sets 3h. 35m. A.
	3	1	♂ in conj. with the ☽ diff. of dec. 4. 8.
16	7	20	Vesta oppo. the ☉
	8	35	♃'s first sat. will em.
17			Mercury R. A. 22h. 7m. dec. 12. 23. S.
	—		Venus R. A. 2h. 9m. dec. 13. 47. N.
17			Mars R. A. 22h. 33m. dec. 10. 18. S.
	—		Vesta R. A. 12h. 5m. dec. 12. 36. N.
	—		Juno R. A. 6h. 38m. dec. 11. 30. N.
	—		Pallas R. A. 20h. 40m. dec. 6. 21. N.
	—		Ceres R. A. 21h. 53m. dec. 19. 57. S.
	—		Jupiter R. A. 6h. 27m. dec. 23. 30. N.
	—		Saturn R. A. 14h. 12m. dec. 10. 28. S.
	—		Georg. R. A. 22h. 17m. dec. 11. 27. S.
	—		☿ passes mer. 22h. 26m.
	—		♀ passes mer. 2 h. 29m.
	—		♂ passes mer. 22h. 52m.
	—		♃ passes mer. 6h. 46m.
19	12	27	☿ greatest elong. 27. 44. W.
	13	10	♃'s third sat. will im.
	18	48	☿ in conj. with ♅ diff. of dec. 0. 29.
20			Clock before the ☉ 7m. 34s.
	—		☽ rises 7h. 22m. M.
	—		☽ passes mer. 2h. 32m. A.
	—		☽ sets 9h. 59m. A.
	1	39	☉ enters Aries, Spring commences.
	2	10	♀ in conj. with the ☽ diff. of dec. 2. 8.
	10	26	♃'s second sat. will em.
22			Occul. κ^1 Tauri, im. 10h. 55m., em. 11h. 36m.
	—		Occul. υ^1 Tauri, im. 11h. 49m.
23	2	42	☿ in Aphelion.
	10	31	♃'s first sat. will em.
25			Clock before the ☉ 6m. 2s.
	—		☽ rises 9h. 37m. M.
	—		☽ passes mer. 6h. 31m. A.
	—		☽ sets 2h. 33m. M.
		8	♃ in conj. with the ☽ diff. of dec. 3. 29.
27	1	22	♃ in □ ☉
	13	2	♃'s second sat. will em.
29			Occul. ι Leonis, im. 11h. 12m., em. 12h. 9m.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR JANUARY AND FEBRUARY, 1836.

1836.	Thermo. Hig.	Thermo. Low.	Barometer. High.	Barometer. Low.	Rain in inches.	1836.	Thermo. Hig.	Thermo. Low.	Barometer. High.	Barometer. Low.	Rain in inches.
Jan.						Feb.					
26	49	29	30,17	30,05		10	50	43	29,87	29,65	
27	46	35	30,01	29,84	,025	11	40	30	30,23	29,91	,225
28	49	38	29,73	29,42		12	47	27	30,08	29,98	
29	42	31	29,45	29,05	,05	13	41	21	30,30	30,25	
30	41	28	29,43	28,98	,2	14	49	35	30,37	30,30	
31	47	28	29,49	29,18	,025	15	50	24	30,39	30,36	,075
Feb:						16	45	24	30,28	29,83	
1	44	35	29,25	29,21	,225	17	37	25	29,84	29,83	
2	40	28	28,98	28,65		18	40	31	30,14	29,96	,05
3	39	32	29,32	28,33	,525	19	37	26	30,24	30,18	
4	39	31	30,01	29,65	,225	20	36	16	30,34	30,25	
5	39	31	30,09	30,05	,025	21	39	13	30,26	30,11	
6	39	28	29,91	29,90		22	43	29	29,94	29,69	,05
7	48	33	29,85	29,73	,025	23	45	28	29,63	29,56	
8	49	30	29,98	29,83	,05	24	44	21	29,40	29,16	,025
9	51	41	29,95	29,84		25	42	25	29,06	29,04	

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

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No. XLIX.

Recent Patents.

To Robert Jupe, *of New Bond-street, in the parish of St. George, Hanover-square, in the county of Middlesex, upholsterer, for his invention of an improved expanding table.*—[Sealed 11th March, 1835.]

This invention of an improved expanding table has for its object the constructing of round, square, oval, or other suitable shaped tables, the surfaces of which are capable of being expanded or enlarged from the centre outward, that is, radially, or both lengthwise and breadthwise; and consists in constructing the tops or surfaces of such tables in parts or sections capable of being drawn outward or expanded from a common centre, for the purpose of allowing suitable shaped pieces or leaves being introduced into the spaces between such sections for the purpose of completing the surface of the table,

so that one table may be made capable of forming a table of two or more sizes. The Patentee states, that the mechanical means by which this may be accomplished are very numerous; he has therefore selected some variations of those plans which he has found to be the most efficient in practice; but he does not confine himself to these means alone, his invention consisting in causing the sections of which the surface of the table is composed to expand from a common centre. We have shown in the following description (reference being had to Plate III.) two variations in the mode of expanding, and in the shape of the table, which will be sufficient to show how their forms may be varied to suit the taste or convenience of the manufacturer.

Fig. 1, shows the surface of a table capable of being expanded into a larger size, as represented at fig. 2, and might be still further extended if required. The expanding and contracting sections being extended further outward than in fig. 2, and the leaves or parts which fill up the spaces between the sections being of larger dimensions.

Fig. 3, represents the surface of a table nearly oval, expanded from a circle.

In the several figures *a*, *a*, are the segments or expanding pieces of the table; and when placed together, as shown in fig. 1, form the table of the smallest size. Fig. 2, shows the segments drawn out or expanded to the position required for introducing the leaves or pieces *b*, *b*, which fill up the spaces between the segments to complete the surface of the larger sized table. One of the leaves is shown detached in plan and edge views at fig. 4. We shall first describe how the segments are caused to expand and contract by hand, and then the construction in which they expand

and contract simultaneously by means of turning the body of the table round. The sections *a*, are securely attached to sliding pieces *c*, (see the detached underside of one of the sections, fig. 6,) moving in the spaces between the guide pieces *d*, *d*, the ends of which are connected together by the hoop or ring *e*, and form the bed of the table; which bed, in this instance, is attached to the main supporting arms *f*, *f*, which project from the pillar of the table. The slides and guide pieces are fitted to each other with a tongue and groove, or dovetail or rabbetted edges, as most desirable. When the table is to be enlarged, the section pieces are drawn outward, as shown in fig. 2; then the several leaves *b*, *b*, are placed on the bed of the table between the segments. The piece of metal *g*, fixed on the pointed ends of the leaves taking into grooves or notches formed round the metal centre pin or button *h*, and project over it to complete the junctions at the centre; the segment pieces *a*, are then forced inward into close contact with the leaves, so as to form the complete surface of the table. The edges of the sections and leaves have projecting ribs or tongues and grooves formed on them, so as to make the joints complete. When it is desired to reduce the table to its original size, the sections must again be drawn out a short distance to liberate the leaves, when they may be removed, and the sections pushed back to their former position. One plan for causing the sections to expand and contract simultaneously, is shown in figs. 7, and 8. It is obtained by curved bars attached to the stationary main supporting arms and saddle pieces connected to the sliding pieces *c*; which saddle pieces embrace the curved bars, and slide upon them as the sections and the bed

of the table are turned round, and cause the sections to expand and contract. In this instance the bed of the table is mounted, resting upon the top part of the pillar in the centre, and the circular bar supported by the arms *f, f,* to which it is attached. The sliding pieces *c, c,* are furnished with saddle pieces *o, o,* mounted on their underside (see the detached views of one of the segments at fig. 9.) These saddle pieces turn upon centre pins to allow them to work freely, and to follow the curve of the excentric bars, and project from the under side of the sliding pieces on to and over the excentric curved bars *l, l,* fixed on to the arms (see fig. 8); which is a plan view of the arms of the circular bar and the curved bars, which, together with the pillar, form the main stationary framework of the table, the bed sliders and the other moveable parts being removed. By turning the segments with the bed of the table round in the direction of the arrows in the several figures, the excentric bars, from their being fixed to the arms of the table, cause the sections, through their connecting saddle pieces and slides, to expand or move outward simultaneously into the position shown in fig. 7, when the leaves *b, b,* may be introduced on to the bed in their proper situations; and by moving the section pieces a short distance round the reverse way, the same connexion will cause the sections to be drawn inwards, closing upon the leaves, and forming the surface of the table complete. When the table is to be reduced to its smaller size, the sections are again to be moved in the direction of the arrows a short distance, and the leaves removed, when the sections will be free to be turned round in the reverse direction, by which the curved excentric bars

will draw in the slides, and with them the sections, so as to form the table of the smaller diameter, as represented at fig. 1.

Fig. 7, is a plan view of the bed placed upon the framework of the table, the sliders being shown in the grooves between the guide pieces, being the position they would be when the table is expanded.

The circular table is expanded into the shape represented in fig. 3, in the following manner:—The side sections *a*, *a*, are of different shapes to the end ones *a**, *a**, and are moved outward into the position shown in fig. 10, or inward by saddle pieces and excentric bars, as before described, by hand, separately, or other convenient means. The leaves and pieces *b*, *b*, required to fill up the spaces between the sections, are also of different shapes, in order to make up the table of the shape shown in fig. 3, and are furnished with projecting ribs or tongues and grooves on the edges, as in the former instance; and it will be perceived that the grooves which expand or contract the side and end sections are of different excentricities, in order to cause them to expand in different proportions.

The Patentee remarks, that all the tables should be supplied with proper stop pieces to prevent the sections from being turned round too far, and expanded beyond the necessary distance; which stop pieces may be placed in various parts, according to the shape or construction of the tables; and further, that the surface of the table may be divided into more or less expanding and contracting sections than those herein shown, to suit different shapes and sizes.

In conclusion, the Patentee states that he does not intend to claim any of the parts separately, nor does

he confine himself to the precise forms or constructions herein shown, but claims as his invention the improved construction of a table, the sections composing the surface being capable of expanding from a common centre outwards.—[*Inrolled in the Inrolment Office, September*, 1835.]

To JAMES VINCENT DESGRAND, *of Size-lane, in the city of London, merchant, for an invention communicated to him by a foreigner residing abroad, of a certain method of weaving elastic fabaics.*—[Sealed 14th November, 1832.]

IN the words of the Patentee, the invention of a certain method of weaving elastic fabrics, communicated to him by a certain foreigner residing abroad, consists in the weaving such fabrics in any suitable looms of ordinary construction, with bare or uncovered strings or cords of caoutchouc or India rubber, interwoven, if necessary, with any of the kinds of spun threads or yarns which are commonly used in weaving, whether composed of silk, cotton, flax, wool or other fibrous materials. The said bare strings or cords of caoutchouc or India rubber being, in all cases, used in the said method of weaving elastic fabrics, without applying any previous covering of silk or other thread around such strings or cords. The said bare strings or cords of caoutchouc or India rubber being, in some cases, used to form the warp of the elastic fabric, spun threads, or yarns of any suitable fibrous materials, being used for the weft, or as parts of the weft; or, in other cases, the said bare strings or cords of caoutchouc or India rubber being used for or

as part of the weft, the warp being composed of spun threads or yarns; or in other cases, such cords or strings of caoutchouc or India rubber being used both for the warp, or as part thereof; and also for the weft, or as part thereof: and the said weaving of bare or uncovered strings or cords of caoutchouc, either with or without combination with spun yarns or threads of any of the kinds usually woven in looms, may be performed in looms of the ordinary constructions, by the ordinary manipulations of weaving other fabrics; those manipulations being conducted with the aid of certain precautions, which I will hereafter point out.

The elastic fabric produced by the said method of weaving bare or uncovered cords or strings of caoutchouc or India rubber, will possess more or less elasticity in one or in both directions, according to the quantity and arrangement of the uncovered caoutchouc strings or cords that are interwoven into the said elastic fabrics.

The aforesaid caoutchouc cords or strings are formed in the same manner as heretofore practised for producing such cords or strings, videlicit, by cutting caoutduchouc or India rubber into thin strips, and stretching them out in lengths, and winding them upon bobbins or reels, where they are left for a sufficient time, until they have entirely, or in a great part, lost their natural elasticity; and, as before stated, they may then be woven, according to the aforesaid method, either alone, to produce an entirely elastic fabric; or they may be combined in several ways, with spun threads or yarns of other kinds of materials, to produce partly elastic fabrics.

By way of example, I will state some of the kinds of elastic fabrics which may be woven according to the

said method. For instance, I sometimes form the warp entirely of bare cords or strings of caoutchouc, or else it may be partly of such cords or strings, and partly of spun yarns or threads of suitable material, and introduce that warp into a loom of any ordinary construction, which is harnessed suitable for the texture of the fabric that I intend to weave; and I work the loom so as to cause the warp to be opened and separated by the harness in a proper order, for all the bare cords or strings of caoutchouc in the warp, as well as the spun yarns or threads that may form a part of the warp, to be more or less covered and concealed by the threads of the weft; the latter being, in this case, composed of spun yarns or threads of cotton, silk, worsted, or other like fibrous materials. When the warp consists, as aforesaid, of strings or cords of bare caoutchouc, with spun yarns or some other material intermingled, the spun threads or yarns of such material are wound on a separate yarn beam from the beam whereon the cords or strings of caoutchouc are wound; and all the yarns, cords, or strings, that are to form the warp are brought from their several beams, through the eyes of the proper headles, with suitable arrangement to produce the kind of fabric desired, whether the same be dimity, or satin, or twilled stuff, or other of the fabrics woven usually in looms of known construction. Another kind of elastic fabric may be woven by the said method, by forming a portion of the warp of spun threads or yarns of cotton, silk, or other like filamentous material, wound on one or more yarn beams, and another portion of the warp of cords or strings of the bare caoutchouc wound on another beam. The said strings or cords of caoutchouc, and spun yarns or threads, being properly intermingled, and brought to

gether into one warp in the loom; and the loom being so harnessed and worked, that in the woven fabric the caoutchouc cords or strings will be enclosed between two complete webs or woven fabrics, one above them and one below them; the shuttle being thrown sometimes above and sometimes below the caoutchouc cords or strings; and the order of the opening of the warp is such that the spun threads of cotton or silk, or other like material in the warp, or certain of the same, pass in and out from the upper web to the lower; that is, the same warp thread will be found in the woven fabric to pass over one of the weft threads of the upper web, then down between the bare cords or strings of caoutchouc of the warp, and under a weft thread of the lower web, and then up again, and so on. The bare cords or strings of caoutchouc are thus separated one from the other in the woven fabric, by the cotton or other kind of spun warp threads interposed between them, and the upper and lower web are united; so that the fabric produced will be a double tissue, with strings or cords of bare caoutchouc included between the two tissues, and running in the direction of the warp: those two tissues being sufficiently united and tied together by the weft threads to unite them as one, without confining the strings or cords of caoutchouc.

Another kind of elastic fabric may be woven according to the said method, by arranging in the loom one or more warps formed of cotton, silk, or other like spun yarns, and either using bare cords or strings of caoutchouc to form the entire weft, or else by using two or more shuttles; one containing bare cords or strings of caoutchouc, and the other containing cotton, or silk, or wool, or other like kind of spun yarns, the loom being harnessed and worked in a proper manner to cause the threads of

the warp to cover entirely the caoutchouc cords or strings of the weft. I sometimes use bare cords or strings of caoutchouc both to form the warp and the weft, without any admixture of any spun yarn of cotton, silk, or other material. The fabric woven by this method will be very elastic in every direction, and may, after being woven, be rendered waterproof, as will be hereinafter described.

By weaving with a double warp in the way before mentioned, as being used to produce a double stuff, with cords or strings of bare caoutchouc enclosed within it, but without uniting the two webs as there described, by all or some of the spun warp threads of each web passing in and out between the weft threads of the other, and by harnessing the loom in the way usually practised for weaving tubular webs for bolting cloths or sacks without seams, I can produce elastic pipes or tubular webs without seams; and if they be woven entirely of bare cords or strings of caoutchouc, they may be rendered waterproof by the means hereinafter described, that is to say, in order to render waterproof the elastic fabrics woven by the said method, with bare cords or strings of caoutchouc, without the admixture of any spun yarns of cotton, silk, or other materials, I dip them in boiling water, or sprinkle boiling water over them, and then I subject them to strong pressure. The effect of this process is to cause the several bare caoutchouc strings or cords of which the woven fabric is composed to agglutinate together, and thus to make it very impenetrable to water.

Note.—The cords or strings of bare caoutchouc being strained, as aforesaid, to their utmost tension before being used in the loom for the same method of weaving elastic fabrics, so as to have lost, in great part, their

natural elasticity, the fabric woven in the loom will possess but little of the intended elasticity immediately on quitting the loom; but it is afterwards rendered again elastic by the application of heat; that is to say, by ironing the said fabric with a heated iron, or passing it around or between heated cylinders. The heat, thus applied, causes the caoutchouc strings or cords to shorten: hence, if they form the warp, the stuff will lose in length by such application of heat; if they form the weft, the stuff will lose in breadth; or if they form part or the whole of both warp and weft, then the stuff will contract in both length and breadth. The amount of contraction of the stuff in any of the kinds of weaving above described should be ascertained at first, by trial before commencing to weave a large quantity of goods; and then, according to the result observed, an allowance should be made in setting up the loom for the particular kind of stuff, and the particular kind and fineness of caoutchouc cords or strings used therein; that is, if the caoutchouc cords or strings are in the warp and not in the weft, the beat up of the lay should be regulated so as to beat up the threads of the weft more or less close together, according to the contraction that will take place in the caoutchouc cords or strings of the warp; and *vice versa*, if the caoutchouc cords or strings are in the weft only, then the threads of the warp should be laid more or less close together in the loom, according to the degree of contraction that will take place in the caoutchouc cords or strings of the weft. It is obvious that no precise directions can be given on this head; but the fact being pointed out, it must be in the discretion of the weaver to set up and work his loom according to the quality of the bare caoutchouc cords or strings that he uses, and the peculiar arrangement

that they may be intended to have in the stuff that he is going to weave.

Note.—I have sometimes found it advisable, in order to give the caoutchouc cords or strings an equal degree of tension in the loom, instead of winding them on a yarn beam, to wind each separately on a bobbin; all the bobbins being loaded with equal weights that they may draw off with an equal tension in the weaving; also to prevent the puckering or rucks, or inequalities which might arise in the stuff, notwithstanding the precautions taken to strain the bare cords or strings of caoutchouc equally. I sometimes introduce at each selvage a cord or string of caoutchouc or India rubber, thicker than those contained in the stuff, and sometimes a wire (which I have found better); which wire is withdrawn as the work advances, but serves during the weaving, to prevent the India rubber cords or strings from being pressed more at one shoot of the weft than at another; and, note, to cause the bare cords or strings of caoutchouc to pass smoothly and freely through the dents or splits of the reed, without getting shagged or roughened, which they are apt to do if no precaution be taken to prevent it. I apply to them in the loom, when the warp is formed there, hog's-lard, or other like greasy material. It will be seen by the foregoing description, that the method of weaving elastic fabrics described therein is applicable to the weaving of elastic fabrics of any texture usually woven in looms of the ordinary and known construction. And it is obvious that various patterns may be produced by varying the colours and arrangement of the spun yarns of cotton, silk, or other material used in weaving various fabrics.

And the bare cords or strings of caoutchouc that form the warp or weft, or both, or a part of either in the

elastic fabric woven in such looms, may be combined with yarns or threads of any other materials with which the quality and degree of fineness obtainable in the bare cords or strings of caoutchouc may render them fit to be mingled and worked.

On the character and extent of these combinations, no precise directions can, from the nature of the subject, be given, but they must be left to the discretion of the weaver. And, whereas, cords or strings of caoutchouc have been heretofore used in various ways for composing elastic articles; as, for instance, by introducing such caoutchouc cords or strings in the said articles to act as springs; the same being contained in pipes or cases of leather, linen, or cotton, or other similar material, in the manner described in the specification of a patent granted to Thomas Hancock on or about the twenty-ninth of April, one thousand eight hundred and twenty: a description of which will be found in vol. ii. page 7, First Series of our Journal.

And, whereas, such caoutchouc cords or strings covered by platting, winding, or otherwise, with cotton or silk, or other like filamentous material, have or may have been combined by laying them together, or platting, or interlacing or netting them together, to form cables, ropes, lines, bags, and other like fabrics or articles, as described in the specification of a patent granted to Robert William Sievier, on or about the first day of December, one thousand eight hundred and thirty-one: the specification of which will be found in vol. i. page 196, Conjoined Series of the London Journal and Repertory.

And, whereas, also such caoutchouc cords or strings so covered with cotton or silk, or other like material, have or may have been woven in combination with

cotton or flax, or other similar yarns, to produce a fabric partially elastic. But bare cords or strings of caoutchouc have not been heretofore used in the warp or weft of a fabric woven in looms of any ordinary construction, and with the usual modes of harnessing such looms. Now, I do hereby declare, that I do not claim the use of cords or strings of caoutchouc when the same are so covered with silk or cotton, or other like material, wound, platted, or otherwise laid around them; or when the same are used merely as springs, or in any other way than I have described hereinbefore. I claim only the method which I have described of weaving elastic fabrics with uncovered or bare cords or strings of caoutchouc or India rubber, in looms of any of the ordinary construction; the said bare cords or strings of caoutchouc, forming either the entirety or any portion of the warp or of the weft, or of both the warp and weft of such elastic fabrics.—[*Inrolled in the Inrolment Office, May*, 1833.]

To LEMUEL WELLMAN WRIGHT, *of Sloane-terrace, Chelsea, in the county of Middlesex, engineer, for an invention of certain improvements in machinery or apparatus for making paper, part of which invention was communicated to him by a foreigner residing abroad, and improvements made by himself.*—[Sealed 15th November, 1834.]

THESE improvements in machinery or apparatus for making paper, consist, first, in a peculiar mode of constructing the wire-work of the moulding cylinder of a machine for making continuous lengths of paper; secondly, in the arrangement of the parts of a paper-

making machine, in which the said peculiar construction of moulding cylinder is adapted, and made to operate; thirdly, in an apparatus or mode of regulating the flow of the water through the moulding cylinder, by means of which the quantity or thickness of the pulp to be deposited upon the surface of the moulding cylinder in the machine may be determined, and any required substance of paper produced; fourthly, in the construction of a peculiar apparatus for drying the paper as it passes from the moulding cylinder and couching roller; fifthly, in a mechanical contrivance for cutting the length of paper into sheets as it passes from the drying apparatus; and, sixthly, in a mode of making paper upon a revolving moulding cylinder in separate sheets, in connexion with a couching cylinder, which is coated with wire cloth, and attached to an exhausting apparatus, and drying those sheets as they pass from the moulding cylinder.

These several improvements are exhibited in Plate IV., and will be fully understood by reference thereto, the respective letters pointing out the same parts in the several figures.

In the construction of the moulding cylinder, which the Patentee prefers to be constructed of brass in all its different parts, several wheels A, A, A, which are represented at fig. 1, (the diameter of which wheels is from two to three feet, more or less, according to the discretion of the manufacturer,) are, firstly, made fast upon an axle or shaft B, B, which shaft is from one and a half to two and a half inches in diameter, according to the required length of the moulding cylinder. These wheels A, the Patentee places upon the axle at from three to four inches apart, for the purpose of giving stability to

the ribs which are to form the cylinder, the two outer wheels being made with strong flanch rings.

When these wheels have been fixed on the shaft, longitudinal wires or round bars *a, a, a,* of metal, about one quarter of an inch in diameter, are attached to the outer parts of the rims of the wheels parallel to each other, and in the direction of the axle at about a quarter of an inch apart. The rods *a,* bear in notches in the peripheries of the wheels A, their ends being passed through holes in the end flange rings, and they are drawn tight by screw nuts *b, b, b,* at the outside of the flange rings.

These ribs *a, a, a,* having been secured to the flange rings, and thereby made to form a cylindrical cage, a continuous wire, about the sixteenth of an inch in diameter, is then tightly wound round the periphery of the cylinder in the direction of a spiral or screw, in order to hold the longitudinal bars firmly in their places in the notches of the peripheries of the wheels. Over this spiral wire round the cylinder, is to be a covering of woven wire or wire cloth, having about fifteen meshes in the inch, which wire cloth is to be fastened in the usual way of securing wire cloths upon paper-making cylinders; and over this wire cloth a covering is to be put of fine vellum wire cloth adapted to the kind of paper intended to be made.

One end of this cylinder is to be closed water-tight, the other end being open for the free passage of the water between the arms.

A cylinder constructed as described is represented in connexion with a machine for making a continuous sheet of paper at fig. 2, which is a longitudinal elevation of the machine with the drying and cutting apparatus.

Fig. 3, represents a plan or horizontal view of the same, the coucher and some other rollers being removed, and part of the standards shown in section, that the parts may be more easily seen. The moulding cylinder C, is mounted in the vat D, D, D, D, the end of its axle turning in plummer blocks fixed on the edges of the vat. Paper pulp prepared in the usual way is to be supplied to the vat, and kept at one uniform height during the operation of making paper by the ordinary means, the moulding cylinder being immersed to the depth of about half its diameter in the pulp. The open end of the cylinder is made to work water-tight against the side of the vat by means of a circular projecting bead *c, c,* on the face of the flange ring, which works against a semi-circular brass ring *d, d,* fixed to the inner side of the vat. This is more evidently shown in the detached horizontal section of a portion of the vat of the cylinder at fig. 4.

The reason of packing one end of the cylinder, and closing the other end, is, that no water shall pass from the vat into the cylinder except through the wire cloth round its periphery.

Near the lower part of the semi-circular packing ring, an aperture *e,* is made through the vat to the discharging trough E, E, which aperture communicates with the interior of cylinder, for the purpose of drawing the water therefrom. This aperture has a sluice, shutter, or cock, to limit the flow of the water from within, and thereby to regulate the hydraulic pressure on the outer or moulding surface of the cylinder. The moulding cylinder is intended to revolve in the direction of the arrow: it is moved by the friction of the travelling endless web of felt *f, f, f, f,* passed round the coucher roller F, between the pressing rollers G, G, and over the driving

cylinder H, which actuates the whole. This driving cylinder and the pressing rollers may be put in motion by wheel gear or straps applied to a rigger on the end of its axle.

The pressing rollers are adjusted by screws *g*, for the purpose of giving any required pressure to the paper as it passes between them on the endless web. The coucher roller F, is a cylinder equal in length to that of the moulding cylinder: its axle is mounted in jointed arms or levers attached to standards I, the roller turning freely on its pivot, and pressing down the felt upon the moulding cylinder by its gravity. As the travelling endless felt gives rotary motion to the coucher roller and to the moulding cylinder, the end of the paper must be first led from the moulding cylinder, and brought in contact with the felt upon the coucher roller; and as they continue travelling, the paper will be carried forward to the pressing rollers, and then to the drying. The water discharged from the inside of the moulding cylinder at *e*, by the adjustable sluice or cock, flows along the channel or trough E, to a well on the opposite side of the vat, where a bucket wheel K, on the end of the shaft of the moulding cylinder, returns into the vat such a quantity of the discharged water as may be required to keep the pulp in a proper state of fluidity. The water retained in the well for the purpose of being raised into the vat again, may be regulated by the discharging cock at the bottom of the well. The drying apparatus consists of a series of rollers mounted upon axles, as shown in fig. 2, which are driven by an endless band *i, i, i, i*, from the pulley *h*, on the shaft of the main driving cylinder. The two rollers *k, k*, which lead the paper to the cutting apparatus, are coupled by gearing wheels *l*; and a pulley *m*, on the axle of the upper

roller carries an endless band *n, n, n, n*, which embraces the pulleys on the axles of all the carrier rollers *o, o, o, o*, and drives them in the proper directions for conducting the paper from the endless felt to the cutting apparatus.

The paper passed by the endless felt between the pressing rollers is taken off by hand, and is then led over and under the several rollers *o, o, o, o*, of the drying apparatus, in the first instance, by strings or straps; and after having been so conducted, it continues passing regularly as it advances over and under the rollers in the manner shown, and between the leading roller *k, k*, to the flat table L, of the cutting apparatus. The drying of the paper is effected by a current of hot air passed through the box or casing intended to enclose this part of the apparatus, which is left open at top and bottom, in order to produce a free circulation of the hot air, and escape of the damp vapour. The paper having been dried, and advanced on to the flat table L, a cutter blade *p*, is made to fall upon it as it passes the edge of the table, which severs the sheet. This cutter blade *p*, is fixed to the top of the two vertical bars of a sliding frame N, N, N, which moves up and down in staples; and this frame is raised and depressed by means of two levers O, O, one on each side of the machine. The fulcrums of these levers O, are in the upright standards, the ends of the shorter arms of the levers passing through mortices at *r*, in the vertical bars N; and the reverse ends, that is, the extremities of the longer arms of these levers, carry anti-friction rollers P, which run upon the peripheries of suitable cam wheels Q, fixed on the main axle H. It will hence be perceived, that as the main axle goes round, the cams will raise the longer arms of the levers O, and, consequently, bring down the frame N, with the cutter blade

p, at intervals; which blade acting against the steel edge of the flat table L, will cut the paper into such lengths or sheets as the cam wheel may be designed to produce. If the length of the moulding cylinder is greater than the required width of the paper to be produced, ribbons, or thin bands of some fibrous material, may be fastened round the moulding cylinder, for the purpose of covering a portion of the wire-work and contracting the width of the paper, or separating the paper as it is moulded into strips of any required width.

The method of forming paper into separate sheets upon a rotary moulding cylinder, and of drying those sheets as they are produced, is shown in the drawings at fig. 5, which is a longitudinal elevation of the machine. Fig. 6, is a plan or horizontal view of the same.

The construction of the moulding cylinders will be the same as above described, the outer wire cloth being either of that description suited to the production of what is called wove paper, or of laid paper. In order to mould the paper into distinct sheets, the periphery of the moulding cylinder must be divided by bands of thin filament fixed round it, as before described; and also similar bands placed in longitudinal directions, at suitable distances apart, for the purpose of dividing the periphery of the cylinder into spaces corresponding to the dimensions of the required sheets, as it must be obvious that the pulp will not form upon those parts where the interstices of the wire cloth is covered. The moulding cylinder being so prepared, is mounted as before in the pulp vat, as shown at C, in figs. 5, and 6, and is worked in the way described in reference to figs. 2, 3, and 4.

On the upper part of the periphery of the moulding cylinder, a couching cylinder R, covered with fine woven

wire cloth, is made to bear, by its axle being suspended in arms or levers connected by pivots, to a standard, as shown in the drawings. This cylinder is formed by uniting four hollow segments or quadrant chambers, and attaching them to arms extending from the axle. These chambers are made air-tight, excepting through the wire cloth covering, by which the paper is to be couched, and a small opening *s*, into each of the chambers at the end of the cylinder. A segment plate S, (shown by dots) having a long groove or recess in it, is mounted so as to rub upon and fix tightly against the face of the quadrant chambers at the end of the cylinder. From this recess in the segment plate S, a communication is made through a pipe or channel T, for the purpose of applying an exhausting apparatus at the aperture *t*

It will now be perceived, that as the couching cylinder revolves, the moment any one of the openings *s*, come opposite to the recess of the segment plate S, the operation of the exhausting apparatus will cause the air to be drawn from the interior of that segment chamber which the whole communicates with; and the effect of this will be a partial vacuum within the chamber, which will cause the sheet of paper to be drawn from the surface of the moulding cylinder on to that of the couching cylinder, where it will be held until it reaches the endless web roller U. At this point the endless felt takes the sheet off the couching roller, and conducts it between the pressing rollers to the drying apparatus. In this way, as the moulding and couching cylinders revolve together, the sheets of paper in succession will be taken from the moulding cylinder, and carried forward to the drying apparatus. The endless felt is extended round the roller U, and also round the cylinder H,

on the main driving axle; the rotation of which cylinder causes the endless felt *f,f,f*, to bring the paper forward, until it is separated from the felt by the sharp edge of an inclined flat plate of steel *j*, which conducts the sheet to a pair of pinching or holding rollers *u, v*. These pinching rollers *u, v*, are mounted in pairs, their axles turning in two endless chains V, V, V, extended over two pair of notched wheels W, W, W, W, which turn on axles supported by the wooden frame. The axles of the lower rollers *v*, of each pair form the bolts of the links of the chains; the axles of the upper rollers turn in brass boxes, capable of sliding in the slots of the links, having small spiral springs in the slots to keep them down.

The upper roller *u*, must be raised at the moment that the sheet of paper passes down the inclined plane *j*, in order that it may be taken hold of and pinched between the two rollers *u*, *v*. This is effected by a sliding bar *w*, which is projected forward by a cam on the wheel X, fixed to the main driving axle of H. The end of this bar has an inclined plane or wedge-shaped end, which, by passing beneath the axle of the upper roller *u*, raise it, and allows the paper to slide in between the two rollers. On the cam of the wheel X, leaving the end of the sliding bar *w*, the bar is forced back again to its former position by a spring, and the two rollers *u*, *v*, come together, and hold the sheet of paper firmly. In order to draw the sheet forward from the inclined plane *j*, the two rollers *u*, *v*, are made to turn by means of the friction of a sliding piece attached to the bar Y. An anti-friction roller at the end of this bar is acted upon by cams on the wheel Z, fixed upon the axle of the driving shaft H; by the rotation of which cam wheel the bar is moved forward, and may be slidden back again by a

spring on a weighted cord. From the under part of the bar Y, the friction piece *y*, shown by dots, extends, which, in advancing, rubs against the edge of the disc *x*, fixed on the end of the axle of the upper roller *u*, and by its friction turns the roller, and causes the sheet of paper to be passed forward. There is a guide *e**, for the purpose of depressing the bar Y, on its return, in order to liberate the friction piece *y*, from the disc *x*. A pin in the inner side of the bar Y, works in the long slot of the guide *e**, which has a central bearing for the pin to slide upon in advancing, but it passes beneath this central bearing in returning. When one sheet of paper has been taken from the endless felt, and pinched between a pair of rollers *u*, *v*, the endless chain must be moved upward for the purpose of bringing a second pair of rollers *u*, *v*, into the same situation; which is effected by a bent lever *a**, *a**, having a pendant latch hook *b**, at its lower end, taking hold of the end of the axle of one of the rollers *v*. This bent lever *a**, has an anti-friction roller *c**, attached to it, which is acted upon by the cams *d**, of a wheel fixed on the before-mentioned main driving shaft H. It will hence be perceived, that as the cams *d**, go round, they will, at the required periods, raise the bent lever *a**, and cause the successive pair of rollers *u*, *v*, to be brought up, to take hold of the several sheets of paper as they are conducted forward by the endless felt in the way described. As the endless chains, with the rollers *u*, *v*, holding the sheets of paper are gradually raised on one side, the friction discs, which are to be fixed at the end of every one of the rollers *u*, (but some of them are omitted in the figure,) the friction discs *x*, are successively brought against a stationary friction surface *f**, which causes the rollers to turn on their axis, and to change the

pendant positions of the sheets of paper while drying. On the descending side of the endless chains, the same takes place; and when the rollers *u*, successively come to the level of the sliding bar Y, the friction piece *g**, acts against the edge of the disc as before, and by turning the roller, discharges the sheet of paper from the machine. It is to be observed, that the drying apparatus, last described, should be enclosed as before, and a current of heated air passed through it, for the purpose of drying the paper quickly.—[*Inrolled in the Rolls Chapel Office,* 15*th May,* 1835.]

Specification drawn by Messrs. Newton and Berry.

To Sir JOHN BYERLEY, *of Whitehead's-grove, in the parish of St. Luke, Chelsea, in the county of Middlesex, for an invention of a composition which will effect a considerable saving in oil and soap used in the woollen manufactories, communicated to him from a foreigner residing abroad.*—[Sealed 22nd April, 1835.]

THE nature of this invention consists in the use and employment of a certain fluid composition (consisting of a saturated solution of lime in water, and a certain quantity of oil properly mixed together, as hereinafter more particularly mentioned and described), for those purposes for which oil is now used in the woollen manufactories, in the preparation and manufacture of wool, whereby a very great saving which may, it is stated, amount to seventy-five per cent. of the quantity of oil now required, or thereabouts; and also a large portion of the soap requisite to cleanse the wool, after

the use and employment of oil in the present mode, will be effected.

The Patentee proceeds to describe the manner in which the said invention is to be performed by the following directions and particulars; that is to say, "to obtain a saturated solution of lime and water in sufficient quantity, I would recommend a tank, or tanks of convenient size for the quantity required in the manufactory, where the same is to be used with a cock or tap in the side, at a convenient distance from the bottom, to draw off the lime water when saturated. When the tank is filled with water, and a quantity of lime, slacked or unslacked, more than sufficient to saturate the water, is put in, (water not being capable of holding a solution more than about one five-hundredth part of its own weight of lime,) the water and lime should be agitated together for a sufficient time, in order that a solution of the lime may take place to saturation, say for a period of from half an hour to an hour; after which, the lime not in solution should be suffered to subside at the bottom of the tank, being allowed from six to twelve hours for that purpose, according to the quantity. The lime water so saturated may then be drawn off at the cock or tap, and a further solution obtained by a repetition of the above process. The softest water is desirable for this purpose, and distilled rain or soft river water are to be preferred. It is evident that lime, whether slacked or unslacked, may be used in preparing the lime water; but it is preferable to use properly slacked lime, as the saturated solution of lime is thereby obtained in a much shorter time. The composition I recommend, is formed and composed of three parts of the saturated solution of lime in water, and one part of any of the oils in use of the woollen manufactories for

the like purposes, which should be mixed together in the above proportions in a convenient tank or vessel, and kept in agitation together by any ordinary method, until such mixture of the lime water and oil shall be completely effected, and the fluid shall have become homogeneous; in which state it is ready for use. The proportion of three parts of lime water and one of oil is not absolutely necessary and essential, but it is the proportion which I prefer, especially for fine wools. The oil, however, may be permitted to bear a somewhat larger proportion than a fourth part, particularly in the preparation of coarse wools, and may then extend to one third part; but the lime water should never exceed three-fourth parts in the composition. The composition thus prepared, may then be used and applied instead of oil in the preparation and manufacture of wool, and may be used for that purpose in the proportion of twenty-two pounds weight of the composition to one hundred pounds weight of wool, or thereabouts; and the wool is afterwards to be cleared from the composition in the same way as it is cleared from oil in the ordinary manufacture, which will require a much smaller quantity of soap than it consumes when oil alone is used.

"Now, whereas, I do not claim as my invention or improvement the saturated solution of lime in water, nor the mixture of such solution with oil, nor the mode of preparing the saturated solution of lime water, nor the mode of preparing the said composition, but only the application of the said composition in the woollen manufacture, instead of oil alone, as above described; thereby occasioning a great saving of oil and soap in the woollen manufactories; and such invention being, to the best of my knowledge and belief, entirely new,

and never before used in that part of his Majesty's United Kingdom of Great Britain and Ireland called England, his dominion of Wales, or town of Berwick-upon-Tweed, I do hereby declare this to be my specification of the said invention; and that I do verily believe this my said specification, doth comply in all respects fully and without disguise with the proviso in the said hereinbefore in part recited Letters Patent contained; wherefore I do hereby claim to maintain exclusive right and privilege tot he said invention."—[*Inrolled in the Rolls Chapel Office, 2nd October*, 1835.]

To JOHN LEVERS, *of New Radford, in the county of Nottingham, machine-maker; and* JAMES PEDDER, *of New Radford, in the county of Nottingham, lace-maker, for their invention of certain improvements in making bobbin-net lace.*—[Sealed 27th February, 1835.]

THESE improvements in machinery for making bobbin-net lace, apply to that description of machines in which the bobbins and carriages are worked by means of fluted rollers and circular combs; and consists in a peculiar mechanism to be appended to such machines for the purpose of commanding certain of the bobbin carriages, in order to prevent their traversing, and to cause the other bobbin carriages that do traverse to turn again at the selvages, for the purpose of dividing the sheet of net into any desired number of breadths: the object of which is, that embroidered patterns or figures of various kinds may be wrought on the edges of each breadth. These objects are effected by making the back fluted rollers hollow, and introducing through the centre of

each hollow roller a longitudinal shaft carrying toothed segments; which toothed segments, when so mounted upon the central shafts, are intended to act in spaces or grooves cut round the peripheries of the hollow rollers; the teeth of the segments being coincident with the flutes of the rollers. The toothed segments are at certain periods of the evolutions of the machine kept stationary, although the rollers turn; which holding of the segments is for the purpose of preventing the non-traversing bobbin carriages, and the turn-again bobbin carriages of each breadth being moved by the revolving rollers; and this occasional retention of those bobbins and carriages, in connexion with the suitable shogging of the bars, produces those movements which are calculated to form selvages and lacing. The holding of the toothed segments is effected by a pendant sector-rack, acting on pinions fixed at the end of each of the internal longitudinal shafts of the back rollers, which sector-rack is actuated through the agency of levers by peculiarly formed cams. The peripheries of these cams determine or govern the vibrating movements of the sector-rack, which drives or holds the toothed segments that act upon the non-traversing and lacing bobbins; whilst another set of cams, or what is technically called cut of wheels, give the required longitudinal or shogging movements to the bars which cause the selvages or patterns to be worked upon the lace. It is to be understood, that the toothed segments introduced into the back fluted rollers may be of any and various thicknesses, in order to cover one or more of the gates of the combs that is to act simultaneously upon one or upon any number of carriages in the back rollers.

In Plate III., fig. 11, represents the four fluted rollers *a*, *a*, and *b*, *b*, in section, as they would be

situate when mounted in the machine. The teeth of the pendant sector-rack *c, c, c,* takes into the pinions *d, d, d, d,* fixed on the ends of the rollers; and by the vibrations of the sector-rack the rollers are turned, which is the ordinary mode of actuating a fluted roller machine. In this instance, the two back rollers *b, b,* are made of larger diameter than the front rollers, for the purpose of affording sufficient substance of metal when bored out; and in order that the peripheries of the four rollers *a, a,* and *b, b,* may all move through equal spaces, and drive the carriages in the circular combs with equal speed, the number of flutes in the larger or back rollers must be increased, and the number of teeth on their pinions also; the latter being driven by an auxiliary sector-rack *e, e,* affixed to the side of the pendant rack *c.* Fig. 12, represents part of one of the back fluted rollers. Fig. 13, is a longitudinal section of the same; *f, f,* is the shaft passed through the hollow roller, with the toothed segments *g, h, i,* affixed to the shaft by arms with dovetails fitting into a longitudinal grove.

Fig. 14, is a transverse section of one of the back rollers *b,* with its internal shaft *f,* and one of the toothed segments affixed thereto. The number of teeth in any one of these segment pieces, must depend upon the number of tails or indentations in the under part of each bobbin carriage; and the arcs of the segments for the inner back roller should contain four-fifths of the number of teeth which would form the complete circle, as fig. 15; while those of the outer back roller need contain only two-fifths of the entire circle of teeth, as figs. 14, and 16, having but one tier of carriages to act upon. Fig. 17, is an end view of one of the back rollers, showing the pinion *d,* by which it is driven, and also on the pinion *k,* fixed on the end of

the shaft *f*, by which the shaft and its toothed segments are actuated or held stationary, independently of the fluted roller which encloses it. The pendant sector-rack, by which the movements of the internal longitudinal shafts *f*, *f*, are governed, is situate at the opposite end of the machine to the ordinary pendant sector-rack, by which the fluted rollers are driven. Fig. 18, shows the additional pendant sector-rack *l*, *l*, which takes into the pinion of the auxiliary shafts *f*. This sector-rack hangs upon an axle fixed in the end frame of the machine, coincident with the centre of the curve of the combs, and when it vibrates, causes the shafts *f*, with the toothed sectors, to revolve, or, when stationary, holds the toothed sectors which confine the non-traversing and turn-again bobbin carriages.

To the middle of the pendant-rack *l*, there are attached, by a joint *m*, two adjustable pieces *n*, *n*, called "half jacks," which are connected to the upper ends of two vertical levers *o*, *o*. These vertical levers *o*, *o*, swing upon studs *p*, *p*, fixed in the end frame; and the lower extremities of the levers carry anti-friction rollers *q*, *q*, working against the peripheries of peculiarly formed cams *r*, *r*, fixed on the same shaft as that which carries the ordinary net wheels. The principle upon which these cams are formed is shown in the diagrams at figs. 19, and 20. The faces of the cams are scribed with circles *a*, *b*, *c*, shown by dots; the diameters of which scribed circles must be proportioned to the length of motion required to work the carriages.

There being two tiers of bobbin carriages to be worked in this machine, there must be three different radii of the cams acting upon the levers; at different periods of the evolutions, the greatest and the least radii determining the extremities of the motions, the

carriages being at those periods either all in the back combs or all in the front, and the middle radii of the cams corresponding to the position of the carriages when they are in the middle; that is, one tier in the back combs, and the other in the front combs.

In that position of the cams and the pendant-rack shown at fig. 18, all the bobbin carriages would be situate in the back combs. As the cams revolve in the direction of the arrows, fig. 18, in passing from the points of the radii 1, to 2, the levers will receive no movement; therefore those of the bobbin carriages which are commanded by the toothed segments will be kept stationary, whilst the other carriages are moving into the front combs, as shown in the sectional elevation of the combs, fluted rollers, bobbin carriages, and the internal shafts, with the toothed segments, at fig. 21.

The front tier of bobbin carriages having passed into the front combs, the front comb bar then shogs one gate to the right. The cams proceeding in their rotary movement will, in bringing the points of their radii 3, into operation upon the anti-friction rollers, move the levers so as to cause the internal shafts to turn with the fluted rollers, and bring the whole of the carriages into the front combs, with the exception of the non-traversing carriages which are left in the back combs. The front comb bar now shogs one gate to the left. The cams moving on, the parts of their peripheries, from the points 3 to 4, act upon the levers *o, o*, which will cause the internal shafts and toothed segments now to turn back with the return of the fluted rollers, the non-traversing carriages and the turn-again carriages having returned to the extremity of their movements in the back combs. The cams, in revolving from 4 to 5, will give no movement to the levers; therefore, the toothed

segments will remain stationary, but the rotation of the fluted rollers will carry the whole of the bobbin carriages into the back combs. The rotation of the cams from 5 to 6, will give the same rotary motion to the internal shafts as the fluted rollers receive; therefore, the bobbin carriages all move together, one tier being brought into the front combs, and the other tier into the back. The movement of the cams from 6 to 7, does the same, and causes all the carriages to pass into the front combs. From 7 to 8, the cams will cause the internal shafts again to turn with the fluted rollers, and bring the carriages into the middle; one tier being in the back combs, and the other in the front: the front comb bar then shogs one gate to the right. The cams, in proceeding from their points of radii 8 to 9, allow the whole of the bobbins to pass into the back combs: the front comb bar then shogs one gate to the left. The periphery of the cams in revolving from 9 to 10, shift the levers, so that they cause the internal shafts with the toothed segments to return with the fluted rollers, and conduct the carriages to the middle. The further rotation of the cams from 10 to 11, continues the same movements of the toothed segments with the fluted rollers, and causes the carriages to occupy the front combs. The cams, in passing from 11 to 12, cause the levers to move the internal shafts and toothed segments with the fluted rollers, and conduct the carriages from the front to the middle. From 12 to 1, the rotation of the cams continuing, causes the carriages to pass from the middle to the back combs into the starting situation; after which, the evolutions of the machine go on again, as described. It will be found from the foregoing, that the carriages at the selvages will turn again, without the necessity of placing turn-agains in the front rollers.

It is to be observed, that though toothed segments are placed in both the back rollers, yet the inside back roller alone causes the carriages to turn again, the toothed segments in the outer back rollers being solely designed for the purpose of preventing such of the carriages from traversing as may be requisite, according to the work to be made. By way of example, it may be stated, that if a toothed segment, wide enough to cover six gates, be mounted in the outer back roller, and a corresponding segment mounted in the inner back roller, and five carriages and bobbins be removed from the front tier, leaving one carriage coincident with the segments at the left at the same time, half the warp threads being withdrawn opposite the same carriages, it will be perceived that these six carriages will pass to and fro in the back and front combs without traversing; the other carriages which do traverse, forming the meshes of the twist net. By these means, a space or opening is left in the fabric of the net at the edge of the breadth, consisting simply of straight threads, for the introduction of a weft thread to be conducted in and interwoven, by means of any of the ordinary modes of working threads by guides and guide bars, according to the pattern required.

The cut of wheels for making the net is shown at figs. 22, 23, and 24: fig. 22, is the comb bar wheel; fig. 23, the back guide bar wheel; and fig. 24, the front guide bar wheel; the numbers placed round these wheels corresponding to the numbers on the cams, figs. 19 and 20.

The Patentees conclude by saying, we desire it to be understood, that we claim, as constituting important features in this our invention, first, the introduction into a lace machine, to be worked on the fluted roller principle, of a longitudinal shaft within each of the back

fluted rollers, for the purpose of carrying toothed segments, which shall be enabled to turn independently of the fluted rollers, and to command certain of the bobbin carriages, for the purpose of giving an extraordinary movement to certain of the carriages, causing some to turn again, and prevent others from traversing. Second, the use of the outer back fluted roller, cut with grooves round it to receive toothed segments or toothed rims, for the purpose of preventing portions of the carriages traversing. Third, the adaptation of cams for actuating the internal shafts of the hollow fluted rollers; by means of which, through the agency of levers and a sector-rack, the toothed segments are worked to govern the non-traversing and the turn-again carriages.—[*Inrolled in the Rolls Chapel Office, August,* 1835.]

Specification drawn by Messrs. Newton and Berry.

To John West, *of Crayford, in the county of Kent, blacksmith, for an improvement on forges.*—[Sealed 9th December, 1834.]

This invention consists in avoiding the prejudicial effects of the fire upon the back of the forge, by causing a stream of water to circulate through a chamber adjoining it, and thereby carry off the heat which would otherwise tend to destroy it.

Fig. 25, Plate III, is a side section of a forge back upon this principle; it is composed of two parts, *a*, and *b*: *a*, is a hollow chamber, and that part against which the heat of the fire acts; *b*, *b*, is a flat plate united to it by any of the ordinary means; *c*, is the induction pipe, and *d*, the eduction, which respectively lead from and to

a tub, or other vessel, placed in any convenient situation. Fig. 26, is a side view of a forge with these improvements adapted thereto.

On the fire being kindled, the heat will communicate itself to the water contained in the chamber *a*, which will accordingly rise, and make its exit through the pipe *d*, when the colder fluid will immediately succeed from the pipe *c*, and thus a perfect circulation will be effected; the water carrying off the heat, and thus preventing a rapid destruction of the forge back.

The Patentee states, in conclusion, that he lays no claim to any parts of the forge which are well known and in use; but he claims as his invention, the producing of a circulation of water within the forge back, as described.—[*Inrolled in the Inrolment Office, June,* 1835.]

To John Jervis Tucker, *Esq., of Trematon-hall, in the county of Cornwall, for certain improvements in urns to be used for tea, coffee, and other purposes.*—[Sealed 22nd January, 1835.]

This invention consists in applying a vessel within the ordinary tea-urn, into which the hot water can be admitted when required, and shut off by means of a cock or valve at other times; the internal vessel being used for the purpose of receiving the tea, coffee, chocolate, or other material intended to be prepared as a beverage; the quantity required to be made being registered by a float, the stem of which passes through the lid of the urn.

In Plate III., Fig. 27, represents the section of an urn

with the improvements adapted thereto: *a, a,* is the outer vessel, which is supplied with water by removing the lid and internal cover *b, b*; *c,* is the ordinary heater, which is carried by a box extending from the internal cover *b*; *e, e,* is the inner vessel, having a communication at pleasure with the outer vessel *a, a,* or aperture *d.* Fig. 28, represents a detached plan view, on a larger scale, of the cock and their ways. It will be perceived, that the spout *d,* has two ways; thence leading to the inner chamber *e,* and the other to the outer chamber *a.* These passages are provided with two cocks *f,* and *g*; the cock *f,* opening a communication with *a,* and the cock *g,* communicating with *e*: *h,* is a plug placed in the centre of the two ways, by means of which the two ways may be made to communicate with each other. In the chamber *e,* there is a float *i,* having a spindle on its upper side; which spindle projects through the lid of the urn.

When it is desired to use the urn, a sufficient quantity of tea, coffee, or other proper matter, is to be deposited within the box *k,* which box is perforated about the bottom with a number of minute holes or slits. The heater having been applied, and the outer chamber *a,* being filled with boiling water, the plug *h,* is to be turned round, when a communication will be opened between the chamber *a,* and the inner vessel *e,* when the water will flow from the former to the latter, lifting with it the float and spindle; and when it is judged that the tea, coffee, &c. has received a sufficiency of water, the plug *h,* is to be closed, and the supply of the water will be stopped. When it is desired to draw off the tea or other beverage, the cock *g,* is to be opened; and if it be required to obtain water, the cock *f,* is to be turned, and it will flow from the vessel *a.* The Patentee remarks,

that the spindle of the float may be graduated, so that the exact quantity of beverage required may be produced without lifting the lid. In conclusion, he states that he confines his claim of invention to the application of the vessel *e, e,* within an ordinary urn; such vessel having an opening or way to and from the vessel *a, a*; and also in the application of a float, as above described.—[*Inrolled in the Inrolment Office, July,* 1835.]

SCIENTIFIC NOTICES AND NOVEL INVENTIONS.

METALLIC LIGHTHOUSES.

It is proposed by Mr. Thomas Brown to employ bronze or cast-iron in the construction of lighthouses, instead of stone. He estimates that a bronze lighthouse would be incomparably cheaper than one of stone,—that it would be more secure against dilapidation or subversion by the action of the waves,—that the lights would be more effectually protected from the spray, which, in the usual buildings, often extinguishes them; and that a lighthouse upon the proposed construction could be erected in situations where a stone structure is impracticable, and in a twentieth part of the time the latter employs. It has been proposed to place a lighthouse on the Wolf Rock, near the Land's-End; a position in which it would be exposed to the most violent storms of the Atlantic. A plan for effecting this purpose in stone was drawn up by Mr. Stevenson, who holds a high rank in this department of engineering. It is estimated that this plan would require twenty years for its execution, and that it would cost 150,000*l.* Mr. Brown undertakes to erect a lighthouse

of bronze ninety feet high, which should answer the purpose as well as the projected stone one of one hundred and thirty-four feet; he proposes to complete his undertaking in four months, at a cost of 15,000*l*. only.

FRANCE.—EFFECTS OF FORESTS UPON THE TEMPERATURE.

A motion has been lately made in the Chamber of Deputies for the general clearing of the woods in France. In the course of the debate a most able and scientific elucidation of the effects of large forests upon climate was offered by M. Arago, which, on account of its general interest, we will endeavour to condense.

The Minister of Commerce proposed an adjournment of the debate, for the purpose of appointing a Committee of Inquiry into this important subject. The proposal was supported by M. Arago, upon the ground that the inquiry involved meteorological problems of great moment.

M. Arago showed that the clearing of extensive woods may be attended with effects of various kinds—the climate may be affected in many ways. He proceeded:—"To form a mean temperature in a given climate, there may be a very unequal distribution in the monthly temperature: it is from hence that Buffon conceived the idea of distinguishing temperate climates from excessive ones. The climate of North America is now severe—that of Europe was equally so before it was cleared of forests. At those early periods the winters were much colder, and the summers much warmer, than at present. You will perhaps be surprised to hear that a few centuries ago the summer heat in the vicinity of Paris was much greater than it is in our own times. This is a fact, however, which is proved by various

documents; among others, by a charter allowing the vine-growers of Amiens to compete with other districts of France, for the honour of supplying the most perfect wines to the table of Philip Augustus. I do not suppose that any wine-growers of Amiens, at the present day, would set up the pretension of being able to supply the best wine to any one.

" A very extensive modification has occurred in the climate of that region of France—it has been the necessary consequence of clearing the woods. Perhaps it was an improvement; but, at all events, extremes ought to be avoided in that, as well as in other things. Some years ago it was imagined that hail might be kept off by sticking long poles into the ground. I myself attacked this process; but it is, nevertheless, certain that forests exercise a great influence over the electric phenomena: and although the theory respecting hail is not generally ascertained, it is sufficiently established that electricity has a great share in its formation. In clearing the mountains of woods, you would, in all probability, increase the liability to hail of the adjacent districts to a ruinous extent. I do not say that this would infallibly be the case, but it might be, and the point is worth mature consideration.

" There is another circumstance which it is necessary to bear in mind. In the countries cleared of wood, all rivers have the character of torrents. At certain periods, volumes of water are sent forth in a short time with excessive rapidity, and in many parts of the year they are quite dry. This species of river you will find in all localities where the mountains have been cleared of wood. Rivers of this description carry down with them immense quantities of mountain earth.

Their beds become raised with wonderful rapidity, thus producing at their embouchures banks of sand, earth, &c., which have a most injurious effect upon navigation. In Italy, since the forests have been cleared away from the Alps, the rivers carry down a quantity of deposit much greater than formerly. I am borne out in this fact by the opinion of M. de Prony. Thus the bed of the Po has risen to such a height, that I believe it is now much higher than the level of many of the streets of Ferrara. An inconvenience of this kind is of serious consequence in any country. I do not mean, I repeat, to decide definitely, but I think there is matter for inquiry; you will find in the Archives of Science sufficient to direct your decision. There is, under the head of meteorology, a number of documents which ought to be searched into; the results of science are numerical, and the objections made to a Committee of Inquiry ought not to prove any obstacle to its appointment.

"I have referred to the quantity of earth and deposit which the rivers of Italy have carried down since the mountains have been cleared of their forests. This quantity was so considerable, that in a canton of Tuscany, in the Val de China, the inhabitants have made use of it to fill up large lakes, and have thereby rendered this district, formerly unhealthy, one of the most fertile in Italy. It is to the exertions of M. Fossombroni that the country is indebted for this great work. I therefore give my utmost support to the proposition for a Committee of Inquiry, presented by the Minister of Commerce."

Upon this highly interesting and scientific speech upon a subject of great importance to France, but of

equal value to every naturalist, we will add a short note by the translator of M. Arago's argument, in explanation of that part relating to mountain torrents.

"It is proved by the state of Wallachia and Moldavia, that in very woody countries the rivers may have the character of torrents, as well as in countries which have been cleared of forests. The mountains in which all the rivers that cross Wallachia and Moldavia have their sources, are so covered with forests, as to be in most parts quite impenetrable to man; yet, of the forty or fifty rivers which issue from them and fall into the Danube, only three, viz. the Oll, the Argis, and the Dniester, are never dry, and have not the character of torrents."

The climate of Germany and Italy has undoubtedly progressively improved during the course of many ages, in which a large portion of the immense forests which covered their soil has gradually been cleared away. By an improvement of climate, we mean a greater approximation to a mean monthly temperature, which is certainly effected by a destruction of large forests, and the consequent opening of the soil to the action of the sun's rays. Cæsar, in his "Commentaries," expressly ascribes the constant severity of the winters in Italy to the immense masses of wood which then covered nearly the whole extent of Germany and Hungary; and Pliny, the great naturalist, traces the coldness and condensation of the vapours in winter to the action of the northern forests upon the air of Italy. From the concurrent accounts of historians and of local writers, it is certain that the winters in the middle and south of Europe are gradually decreasing in severity; the rivers of France and Italy are not so often frozen, nor to the extent as they formerly were; and the average cold of winter in

Germany and Great Britain is decidedly less than two or three centuries ago.

RAILWAYS.

The subject of the numerous applications made this session to Parliament, for leave to bring in Bills for projected railways, has excited a deep interest throughout the country. These applications involve property to an immense extent; and if generally allowed, would, in all probability, prove injurious rather than beneficial to the public. The petitions have been referred to a Select Committee.

In the early part of the session, fifty-seven petitions for railways, involving an estimated outlay of upwards of 28,000,000*l.* sterling have been presented to Parliament. To these petitions, 36,978 names as assents, 6,575 dissents, and 7,475 neuters have been affixed.

The Select Committee, after making a very sensible report upon the immense amount of capital proposed to be embarked, and the sacrifice of property which owners of land, &c. are called upon to make, which renders it a paramount duty of the House of Commons to take every precaution against the disastrous consequences which must follow the failure of the schemes from fallacious calculations, or from the non-advancement of the proposed capitals, submitted, in their report, a series of resolutions for the general regulation of the bills, and a full examination of the means and probable results of the proposed schemes submitted to Parliament. The House adopted the resolutions submitted in the report; and in future every project will be subjected to a rigorous and searching examination of its merits and means of accomplishment, previous to a bill being allowed to pass its first stages. The adoption of these safeguards can alone preserve the public from the effects

of the mania which threatens the absorption of an excessive proportion of the national floating capital in speculations, the results of which, in numerous instances, are highly problematical.

THE BRUSSELS AND ANTWERP RAILWAY.

The projects for railroads are almost as numerous and diversified upon the Continent as at home. The above work is, perhaps, the railway of all others which has been constructed at the least expense, and will probably prove the most successful as to its returns. The country it intersects is almost a dead level; which circumstance has, of course, proved highly in favour of the undertaking. The line of railway from Brussels to Malines has been completed for some time past, and has been far advanced towards the Scheldt. The town of Malines is situated considerably more than half way from Brussels to Antwerp. The works have been subjected to a temporary suspension, in consequence of an order received from the Government forbidding its further progress, upon the ground that the line of the railroad is advanced too near to the citadel of Antwerp, and that it might compromise the defences of that place. It appears that the objection was made by General Haxo, of the corps of the French engineers, who represented the danger in a military point of view, which might occur by the approximation of the line to Antwerp.

The objection is perfectly futile; for in case of any change of circumstances which might endanger the safety of Antwerp, no military operation could be more quickly executed, than that of destroying an iron railroad upon a level country; constructed without raised arches and viaducts, which could alone present points of attack and defence from the solidity of their con-

struction. It is to be hoped that, upon due consideration, the Belgic Government will withdraw its opposition to this highly useful undertaking: the prospective advantages of which are justly estimated by those who are engaged in traffic between Belgium and Holland.

List of Patents

Granted by the French Government.

(Continued from p. 386, vol. vii.)

To Charles Victor Bastiné, of Paris, for a new mechanism which lessens considerably the friction in locomotive engines.

— Coront du Cluseau, of St. Julien Molin Molette, for a new mechanism applicable to the milling of silk.

— Narcisse Delerm, of Auch, for a thrashing machine.

— Eude and Cailly, for a mechanism for giving to a ship placed on a clock all the motions caused by the action of the sea.

— Louis Laurent Paillette, of Paris, for an improved kind of bellows.

— Hugues Darier, of Paris, for a method of manufacturing tubes of copper, sheet iron or zinc, without soldering or rivets.

— Pierre Isidore Rouen, of Paris, for an improved kind of lamp.

— Marie Renette, of Paris, for an improved fire-arm to be loaded at the breech.

— Gillot and Hanriot, of Nuits, for a machine for driving the corks into bottles with expedition and economy.

— Nisole, Bonvallet and Delattre, of Paris, for a method of mixing every kind of wool with every kind of vegetable fibrous substance.

— Gabriel Laury, of Paris, for a chimney-piece containing a cooking apparatus.

— Jean Francois Marie Carrier, for a process by which the juice of baked onions may be employed in lieu of baked onions.

— Firmin, Didot, and Thuvien, of Paris, for a new printing press.

To Joseph Pergier, of St. Etienne, for a mechanical batten to be adapted to the Zurich and Jacquart frame.

— Jean Baptiste Francois Corradi, for cylindrical shutters to be used in lieu of the moveable shutters employed in closing shops.

— Martian Germain, of Paris, for a new system of primers for fire-arms with percussion locks.

— Myrtile Amarylis Foucard, of Paris, for the application of flexible stems to buttons made of horn.

— Francois Perdrisal, of Bourges, for a mechanical means of bending, when cold, the iron used for the tires of wheels.

— Lucien Gorme, of Mouroux, for a new method of cleansing wheat.

— Dubois and Brest, for a new apparatus for unsalting sea water.

— Jacquet, Brothers, of Lyons, for a newly-disposed stove wherein gas for illumination may be manufactured while the stove heats the room.

— Paul Bidault, of Bordeaux, for a knitting frame.

— Joseph Rigollet, of Paris, for a new method of manufacturing silk hats.

— Edouard Marie Tardy, of Paris, for a new mechanism for fastening folding doors.

— Barthelemi Giraud, of Digne, for an improved oven to be heated with coal.

ADDITIONAL SPECIFICATIONS INROLLED BY THE FOLLOWING PATENTEES.

To John George Bodmer, of Bolton-le-Moors, represented by Mr. Perpigna, advocate, of the French and Foreign Office for Patents, 4, Rue Choiseul, on his patent for improvements in steam-engines, boilers, and furnaces.

— James Perry, of London, represented in Paris by Mr. Perpigna, advocate, on his patent for improvements in pens and penholders.

— Miles Berry, engineer, of London, represented in Paris by Mr. Perpigna, advocate, on his patent for improvements on ocomotive engines, on boilers and chimneys adapted to the furnaces of such boilers.

— Amassa Stone, of Rhode Island, represented in Paris by Mr.

Perpigna, on his patent for improvements on the weaving frame.

To Simon Grosjean, on his patent for improvements in the manufacturing of sulphuric acid.

— Francois, Brothers, of Nantes, on their improved harpoon.

— Anacharsis Ménier, of Bordeaux, on his hydraulic machine.

— Frimot Senior, of Paris, on his improved steam-engines.

— Desbassyns de Richemont, of Paris, on his method for preserving alimentary substances.

— Henri Pape, of Paris, on his improved piano.

— Jean Joseph Pigalet, of Paris, on his system of hydraulic pressure applicable to the making of artificial waterworks.

— Pascal Huard, of Beaumont le Vicompte, on his weaving frame.

— Christophe Elie Lantillon, of Lyons, on his new silk fabric.

— Francois Berjou, of Paris, on his horse-shoe called by him *hippo sandale.*

— Jean Antoine Gervais, of Paris, on his power engine.

— Adrien Jean Pierre Thilorier, of Paris, on his hydrostatic lamp.

— Pierre Touboulic, of Paris, on his apparatus called by him *rame axiale.*

— Koch and Grasse, of Guebuiller, on their apparatus for driving the water several times over the same hydraulic wheel.

— Stanislas Sorel, of Paris, on his fire-regulating apparatus.

— Fourcault de Pavant, as transferee of Mr. Mapeau, on his method of concentrating alimentary substances.

— Auguste Koch and Co., of Guelweller, on their machine for winding and twisting the waste threads in spinning machines.

— Fossin, Father and Son, of Paris, on their method of inlaying in gold precious stones of various kinds.

— Jean Thomas Castor, of Corbeil, on his machine for sifting vermicelle and semoule.

— Houzeau and Muiron, of Paris, on their method of melting iron and other ores.

— Beatus Beringer, of Paris, on his guns which are to be loaded at the breech.

— Francois Cabrol, of Paris, for improvements on his blowing machine.

To Auguste Moineau, of Paris, for improvements on his fly-wheel.

— Marion de la Brillantais, for improvements on his flour-mills.

— Jaillet, jun., of Lyons, eleventh improvement on his frame for ornamented fabrics.

— Antoine Henri Mareschal, as transferee of Mr. Coisplet, for improvements on his method of manufacturing culinary utensils.

— Grangier, Brothers, of St. Chamond, for improvements on their frame for manufacturing ribbons.

— Joseph Francois Tripot, of Paris, for improvements on his method of preparing rags for making paper.

— Felix Godefroy Bouvier, of Orange, for improvements on hi apparatus for curing smoky chimneys.

— Charles Dearne, as transferee of Mr. Wattebled, for improvements on his machine for cleansing wheat.

— Daven and Leloup, bakers, of Paris, on their economical process of making bread.

— Joseph Alexandre Robert, of Paris, for improvements on his fire-arm.

— Antoine Galy Cazalat, of Paris, seventh improvement on his steam-carriage.

— Antoine Galy Cazalat, eighth improvement on the same.

— Dominique Savinien Jeubert, of Paris, for improvements on his mechanical lamp.

— Jean Francois Gobert, of Boissy St. Leger, for improvements on his window-blinds.

— Charles Louis Derosne, of Paris, on his method of manufacturing sugar.

— Casimer Lefaucheux, of Paris, for improvements on his fire-arm.

— Plantevignes, of Bordeaux, for improvements on his apparatus called by him *railway marin.*

— Auguste Stanislas Lebobe, of Paris, third improvement on his method of roofing houses.

Patents granted from the 1*st of July to the* 31*st of October*, 1835.

PATENTS FOR FIFTEEN YEARS.

To Patrick Seyton Hynes, of London, represented in Paris by Mr. Perpigna, Advocate of the French and Foreign Office for

Patents, 4, Rue Choiseul, for an improved method of locking the wheels of carriages.

To Denis Hilaire Treameau, of Druyes, represented in Paris by Mr. Perpigna, advocate, for a process of obtaining ocres of various colours.

— Ledru and Saget, represented in Paris by Mr. Perpigna, advocate, for a portable hydraulic machine.

— Claudot Dumont, of Paris, for a disinfecting paper to be used in the healing of sores.

— John Streel Brickwood, of London, for improvements in typographic presses.

— Antoine Jean Louis Huet, of Paris, for an hydraulic machine.

— Auguste Delavelaye, of Dijon, for a steam-engine with a central guide.

— Jean Louis Vergniais, of Lyons, for an hydraulic machine.

— Amedée Durand, of Paris, for an improved windmill.

— Dupuy de Grandpré, of Bordeaux, for a machine for towing boats against the stream.

— Hoene Wronski, of Paris, for a dynamogenic system of steam-engine.

— The Royal Manufactory of St. Gobain, for a machine for polishing looking-glasses.

— Louis Marie Marion de la Brillantais, of Paris, for a new steam-engine.

— The same, for a new method of using coal-tar and bituminous substances.

— The same, for a machine for cutting into sheets the wood used for veneering.

— Edward Hall, of Paris, for a steam-engine without a beam.

— Louvrier Gaspard, of Paris, for an evaporating apparatus.

— Isaac Hawkes Bedfort, of Birmingham, for improvements in the cutting and polishing of crystal.

— Joseph Raymond, of Paris, for improvements in the wheels of carriages.

— D'Homme and Romagne, of Paris, for an improved frame for manufacturing ornamented tissues.

To Perrot, civil engineer, of Rouen, for machines for the printing of paper and cotton, or other fabrics.

— Charles Dimott, of Paris, for an improved kind of tile.

— Albert Gabriel Francois Thomas, of Paris, for a machine for drying wheat and any other kind of corn.

— Pierre Grives, of Paris, for improvements in the manufacturing of soap.

— Charles Picot, of Chalons, for an improved machine for cutting into thin sheets by means of a sharp instrument the wood used for veneering.

PATENTS FOR TEN YEARS.

To Antoine Perpigna, advocate of the French and Foreign Office for Patents, 4, Rue Choiseul, for a peculiar preparation applicable to meat, and by the agency of which it may be preserved without taint for a considerable time.

— Brame Chevalier, of Lille, represented in Paris by Mr. Perpigna, advocate, for an apparatus for clarifying syrups.

— Pean and Bouchet, of Chaumont sur Loire, represented in Paris by Mr. Perpigna, advocate, for an improved evaporator for the concentrating of acids, and of alkaline or saccharine liquors.

— Francois Oderu, of Lyons, for a method of dressing all kinds of crape.

— Louis Alexis Joseph Guenesson, of St. Quentin, for improvements on Wolff's steam-engines.

— John Williams Underwood, of Villey, for an hydraulic machine.

— Osmond, of Paris, for a new method of cutting marble.

— Ricard and Béraud, of Lyons, for a method of making, with coloured glass, tiles and architectural ornaments.

— Isvard and Pichenot, of Paris, for a new organ, productive of sound, and applicable to several musical instruments.

— Francois Thebe, of Tarbe, for a press with a continuous action for hot-pressing and glazing papers of all kinds.

— Fan-Zvoll, of Paris, for a machine for making wooden mouldings.

To Mathieu Rister, of Cernay, for improvements in carding machines.

— John Bambridge, of London, for improvements in wind and water-mills.

— Guillemin Lambert, of Autun, for a percussion gun.

— Viesnegg, of Paris, for a lamp burner.

— Charles Vallery, of St. Paul sur Rille, for a machine for grinding the woods used for dyeing.

— Adrien Louis de Beurges, for a new method of making paper by machinery.

— Leon Fournier, of Aigre, for a distilling apparatus.

— Marie Louis Antoine Baude, for improvements in the Jacquart frame.

PATENTS FOR FIVE YEARS.

To Bryan Donkin and Co., of London, represented in Paris by Mr. Perpigna, advocate, of the French and Foreign Office for Patents, 4, Rue Choiseul, for improvements in machines used for the manufacturing of paper.

— Fouque, of Toulouse, represented in Paris by Mr. Perpigna, advocate, for a machine for uniting a chain-cable to a rope-cable.

— Machu and Black, of Lille, for a process of manufacturing blond lace with cotton or silk, plain or striped.

— Ruban and Blanc, of Grenoble, for a machine for pounding plaster of Paris.

— Thomas Lebesnier, of Rennes, for a new kind of truss.

— Louis Muller, of Lyons, for a brass musical instrument called by him *bugle with three pistons.*

— Seguin, Brothers, of Paris, for improvements in the construction of suspension bridges.

— Flandin, of Paris, for a cosmetic called by him *oleagine.*

— Alexandre Marie Guinet, of Paris, for a lithographic press with affixed pressure.

— Jean Cesar Moirau, of Paris, for a cosmetic for softening, healing, and beautifying the skin.

To Caiman Duverger, of Paris, for a new bit for horses called by him *licos*.

— Dugas, Brothers, and Co., of St. Chamont, for a method of brocading ribbons with various coloured silks.

— Daudville and Co., of St. Quentin, for a new kind of cotton fabric brocaded with one of several colours.

— Georges Côte, of Lyons, for a frame for manufacturing velvet with only one treadle.

— Mathieu Brian, of Sainte Foy, for a machine for grinding plaster of Paris.

— Jean Louis Amable Leroux, for a method of spinning cotton without moving the spindles.

— Jean David Passerou, of Paris, for a sweet-scented water called by him *arquebusade water*.

— Benjamin Dropsy, of Paris, for the application of the lava of Mont d'Or to all the purposes for which glazed earthenware is generally used in the making of stoves.

— Jean Baptiste Valette, of Paris, for a bathing tub made of artificial marble.

— Hubert Melchior Marion, of Paris, for spring eye-glasses.

— Antoine Malagon Desirabode, of Paris, for a crampon hook applicable to artificial teeth.

— Francois Amié Benoit, of Paris, for cotton skeletons without any apparent seams to be used for stiffening silk hats.

— Charles Giroudot, of Paris, for improvements on the Cowper presses.

— Camille Lepaul, of Paris, for an apparatus for curing smoky chimneys.

— Godefroy Desmoulins, of Voiron, for an omnibus with a mechanism on each side to prevent its upsetting.

— Amiot, Jarry, and Lale, of Paris, for an apparatus for warming carriages by means of hot water.

— Jean Louis Petitbon, of Paris, for a mechanical mould for the casting of brass letters and ornaments used in book-binding.

— Francois Duchesnoy, of Paris, for a new system of press applicable to the pressing of paper.

To Vaussin Chardanne, of Versailles, for a new instrument, called by him *celeri-metre*, to be used instead of the chain in land surveying.

— Jean Victor Carbon, of La Flèche, for improvements in fire-arms.

— Francois Tranchat, of Lyons, for a winder for raw silks.

— Pierre Delpech, of Cahors, for a press for stamping potters' clay.

— Brewer, of London, for a machine for making paper.

— Daudré, of Ellinghem, for a method of putting up or taking down the sails of windmills while in rotation.

— Jacques Vignal, of St. Etienne, for a new method of milling silks.

— Amedée Brutus Villeroi, of Paris, for an apparatus for lessening the draught of boats, and enabling them to sail up rivers where the water is shallow.

— Louis Jules Cellier, of Paris, for improvements in the manufacturing of shoes.

— Pierre Isidore Chemin, of Paris, for a new syringe.

— Fossin and Co., silversmiths, of Paris, for an enamelled silver gilt kind of plate.

— Antoine Buisson, of Grenoble, for an economical calefier for warming great establishments.

— Piolaine and Crevier, of Dieppe, for a mechanism imitating the motions of a ship at sea.

— Dunogué and Taupier, of Paris, for a new method of teaching simultaneously writing, reading, and arithmetic.

— Ruffier Lauche, for a composition applicable to floors of apartments, &c., to be used instead of wax.

— Jaynot, Brothers, of Paris, for a new process of drawing and bending leather.

— Charles Albert Chaumonnot, of Paris, for a wine of sassaparilla.

— Louis Francois Florimond Boulanger, of Paris, for an improved steam coffee pot.

To Louis Michel Hanot, of Amiens, for an hydraulic apparatus applicable to water-closets.
— Marie Joseph Gerelot, of Paris, for a new kind of primer for fire-arms.
— Michel Nicolas Georget, of Arras, for an improved macerator for extracting the juice of beet-root.
— Machu and Black, of Lille, for improvements in the manufacturing of plain and ornamented blond lace.
— Perière Dechevailles, of Paris, for a new kind of mirror for larks, which mirror may be adopted to fowling-pieces.
— Pradal, of Nantes, for an improved method of manufacturing soldier's caps.
— Georges Côte, of Lyons, for a mechanical wearing frame.
— René Marie Cazal, of Paris, for improvements in umbrellas.
— Antoine Fauri, of Paris, for improvements in carriage wheels.
— Richard Cantegril, of Paris, for an artificial leg.
— Antoine Alphonse Loddé, of Paris, for an improved broom of feathers for dusting.
— Charles Francois Thues, of Charenton St. Maurice, for a mechanical means of manufacturing starch.
— Fauguer Laboullée, of Paris, for a means of softening and neutralizing the soap used for the toilet.

ADDITIONAL SPECIFICATIONS INROLLED FOR IMPROVEMENTS BY THE FOLLOWING PATENTEES.

To Brame Chevalier, of Lille, represented in Paris by Mr. Perpigna, advocate, of the French and Foreign Office for Patents, 4, Rue Choiseul, on his hot-air apparatus for evaporating syrups.
— Delarothiere, of Troyes, represented in Paris by Mr. Perpigna, on his process of making of stockings.
— Marion de la Brillantais, of Paris, third improvement on his mills for grinding corn.
— Marion de la Brillantais, of Paris, fourth improvement on the same.
— Fruictier, of Sery, on his roving and spinning frames.

To Don and Ragon, of Paris, on their improved railways and locomotive engines.

— Jean Petit, of Paris, on his tub for foot bathing.

— Claudot Dumont, on his disinfecting paper used for the healing of sores.

— Jean Viel, of Incheville, near Eu, on his spindle.

— Benjamin Wiston Wells, of London, on his process for making sea water potable.

— Henri Pape, of Paris, on his sounding board for increasing the sound of a piano.

— Manceaux and Laffaneur, of Paris, on their cartridge box.

— Lunard and Co., of Paris, on their method of preparing New Zealand flax.

— Charles Guigo, of Lyons, on his wearing frame.

— Salomon, of Metz, on his new system of printing.

— Francois, Brothers, of Nantes, on their harpoon gun.

— Joseph Morleix, of Lyons, on his method of applying caoutchouc to the making of gentlemen's stocks.

— Pierre Simon David, of Lyons, on his winding frame.

— Antoine Jean Louis Huet, of Paris, on his hydraulic machine.

— Jean Baptiste Bonniot, of Larochelle, on his dragging machine.

— Jean Jouela, of Pemautier, on his flour-mill.

— Edouard Lanet, of Bordeaux, on his copying press.

— Laurent, of Beaucaire, on his windmill.

— Joseph Francois Tripot, on his machine for preparing rags for making paper.

— Joseph Alexandre Robert, on his lamp.

— Jemetel, sen., on his oven heated by hot air.

— Jean Baptiste Marie Ragon, on his system for reducing corn into flour.

— Martin and Champonnois, on their macerator used for extracting from the beet-root all the saccharine juice it contains.

— Francois Jules Manceau, on his method of manufacturing helmets with leather.

To Francois Cabrol, on his method of projecting into furnaces oxide of carbon and other gases.

— Jean Jacques Courtois, of Issy, on his new kind of brick to be used in building chimneys.

— Cellier Blumenthal, on his vacuum apparatus for concentrating sugar.

— Lassalle and Bellocq, on their fixed or moveable fire-grates.

List of Patents

Granted in Scotland in March, 1836.

To William Bulnois, Esq., jun., of Gower-street, London, for an improved combination or arrangement of springs for carriages.—27th February.

— Robert Griffith, of Birmingham, machine maker, for improvements in machinery for making rivets, screw-blanks, and bolts.—27th February.

— William Wainwright Potts, of Burslem, china and earthenware manufacturer, for an improved method or process of producing patterns in one or more colours to be transferred to earthenware, porcelain, china, glass, and other similar substances.—1st March.

— John Baillie, of Great Suffolk-street, Southwark, engineer, and John Paterson, of Mincing-lane, London, for improvements in propelling of vessels and other floating bodies by means of steam or other power.—1st March.

— Miles Berry, of the Office for Patents, No. 66, Chancery-lane, London, civil engineer and mechanical draftsman, in consequence of a communication made to him by a foreigner residing abroad, for a certain improvement or certain improvements in power-looms for weaving.—4th March.

— William Wilson, of Glasgow, manufacturer, for a method of making chains of wire.—7th March.

— Charles Schafhautl, of Sheffield, for an improved gear for obtaining a continuous rotatory action.—8th March.

To Charles Schafhautl, of Sheffield, for an improved steam generator.—8th March.

— John Bursham, of Stepney Causeway, oxalic acid manufacturer, for improvements in the manufacture of oxalic and salacelocella.—8th March.

— Charles George Gilroy, of Argyle-street, New-road, St. Pancras, engineer, for certain improvements in machinery for weaving plain and figured fabrics.—15th March.

— Francis Brewin, of the Kent-road, London, for a certain new and improved process of tanning.—18th March.

— James Morrison, of Paisley, manufacturer, for improvements in the Jacquart frame, and on what is called the ten-box lay, and on the reading and stamping machines used in making shawls and other figured work.—18th March.

New Patents
SEALED IN ENGLAND,
March, 1836.

To William Gilyard Scarth and Robert Scarth, both of Leeds, in the county of York, dyers, for their having invented the manufacturing or preparing of a certain substance for blue dyers from materials not hitherto used for that purpose, applicable for dyeing blue and other colours.—Sealed 25th February—6 months for inrolment.

To James Barron, brass-founder, and Edward Thomas, workman to James Barron, both of Birmingham, in the county of Warwick, for their invention of improvements on bedsteads, and apparatus to be used with or for bedsteads.—Sealed 25th February—6 months for inrolment.

To Robert William Sievier, of Henrietta street,

Cavendish-square, in the county of Middlesex, gentleman, for his invention of an improvement in the means of dissolving and preparing caoutchouc or India-rubber for various purposes.—Sealed 27th February—6 months for inrolment.

To James Martin, of Charing-cross, in the parish of St. Martin-in-the-Fields and city of Westminster, gentleman, for an improvement in dissolving and preparing caoutchouc or India-rubber to render it applicable to various useful purposes, being a communication from a foreigner residing abroad.—Sealed 27th February—6 months for inrolment.

To William Bates, of Leicester, fuller and dresser, for his invention of improvements in the process of finishing hosiery and other goods manufactured from lamb's wool, Angola, and worsted yarn.—Sealed 8th March—6 months for inrolment.

To Charles Schafhautl, of Sheffield, in the county of York, gentleman, for his invention of improved gear for obtaining a continuous rotary action.—Sealed 8th March—6 months for inrolment.

To Anthony Theophilus Merry, of Birmingham, in the county of Warwick, metal dealer, for his invention of the application of certain white metal plated to certain manufactures of which it has not hitherto been applied.—Sealed 8th March—6 months for inrolment.

To James Morison, of Paisley, North Britain, manufacturer, for his invention of improvements on the Jacquart machine, and on what is called the ten-box lay, and in the reading and stamping machines used in making shawls and figured work.—Sealed 8th March—6 months for inrolment.

To John Galley Hartley, of Devonshire-street, Bishopsgate-street Without, in the city of London, manufacturer of caoutchouc, for his invention of improvements in preparing or manufacturing caoutchouc or India-rubber for various useful purposes.—Sealed 8th March—6 months for inrolment.

To John Godwin, of Cumberland-street, Hackney-road, in the county of Middlesex, piano-forte maker, for his invention of an improvement in the making or construction of piano-fortes. —Sealed 8th March—6 months for inrolment.

To Benjamin Simmons, of Winchester-street, in the borough of Southwark and county of Surrey, engineer, for his invention of certain improvements in retorts, stills, and other chemical apparatus, and the machinery connected therewith, and by the use or employment of which various processes can be more speedily, conveniently, and economically performed.—Sealed 8th March—6 months for inrolment.

To George Holworthy Palmer, of the Canal-grove, Old Kent-road, civil engineer, for his invention of an improvement in the purification of inflammable gases, and an apparatus by which the improvement is applied, such other apparatus being also applicable to other useful purposes.—Sealed 8th March—6 months for inrolment.

To Charles Guynemer, of Manchester-street, Manchester-square, in the county of Middlesex, professor of singing, for certain improvements in piano-fortes, being a communication from a foreigner residing abroad. —Sealed 8th March—6 months for inrolment.

To George Lawrence, of No. 9, New Bond-street,

St. George's, Hanover-square, in the county of Middlesex, dressing-case maker, for his invention of a certain improvement in the screws used in fastening the mouths of mounted inkstands, perfume, liquor, and medicine bottles; also in fastening the mouths of jars and tumblers used for paste, salve, powders, preserves, and other purposes.—Sealed 8th March—2 months for inrolment.

To James Diggle, of Bury, in the county palatine of Lancaster, engineer, for his invention of certain improvements in steam-engines.—Sealed 8th March—6 months for inrolment.

To Charles Watt, of Clapham, in the county of Surrey, gentleman, for his invention of certain improvements in preparing, purifying, and refining tallow, stuff, fatty materials, and animal and vegetable oils for various useful purposes.—Sealed 8th March—6 months for inrolment.

To John Masters, of Leicester, in the county of Leicester, for his invention of an improved essence of anchovies.—Sealed 14th March—6 months for inrolment.

To John Chalklen and Thomas Bonham, of Oxford-street, in the county of Middlesex, water-closet manufacturers, for their invention of an improvement or improvements on their instrument or apparatus commonly known by the name of vices.—Sealed 14th March—6 months for inrolment.

To Edward Jelowicki, of No. 8, Seymour-place, Bryanstone-square, in the county of Middlesex, esquire, for certain improvements in steam-engines.—Sealed 14th March—6 months for inrolment.

To Thomas Alcock, of Claines, in the county of Worcester, lace manufacturer, for his invention of certain improvements in machinery for making bobbin-net lace, for the purpose of producing certain kinds of ornamental bobbin-net lace and other fabrics, by aid of the improvements which are in part applicable to machinery constructed according to his former improvements, for which two several Letters Patent were granted to him on the 8th day of December, 1832, and others Letters Patent on the 12th day of February, 1835.—Sealed 17th March—6 months for inrolment.

To Alphonsus William Webster, of Regent-street, in the county of Middlesex, aurist, for his invention of an instrument or apparatus to be applied to the ear to assist in hearing.—Sealed 17th March—6 months for inrolment.

To John Birkby, late of High Town, but now of Upper Rawfolds, both in Liversedge, near Leeds, in the county of York, card maker, for his invention of improvements in machinery for making needles.—Sealed 17th March—6 months for inrolment.

To Robert Brettle Bate, of No. 21, Poultry, in the City of London, optician, for his invention of certain improvements upon hydrometers and saccharometers, for the term of seven years, to be computed from the 21st day of March instant; being an extension of former Letters Patent for the said invention, granted to the said R. B. Bate, by his late Majesty, King George IV.—Sealed 21st March.

To Louis Elizee Seignette, of Mincing-lane, in the City of London, merchant, for improvements in preserving animal and vegetable substances; being a commu-

nication from a foreigner residing abroad.—Sealed 21st March—6 months for inrolment.

To Walter Hancock, of Stratford, in the county of Essex, engineer, for his invention of an improved arrangement and combination of certain mechanical means of propelling vessels through water.—Sealed 21st March—6 months for inrolment.

To Francis Gybbon Spilsbury, of Newman-street, Oxford-street, engineer, for his invention of certain improvements on machinery or apparatus for stamping up and compressing metals or other substances.—Sealed 22nd March—6 months for inrolment.

To William Maugham, of Newport-street, Lambeth, in the county of Surrey, chemist, for his invention ot certain improvements in the production of chloride of lime and certain other chemical substances.—Sealed 22nd March—6 months for inrolment.

To William Hale, of Greenwich, in the county of Kent, late of Colchester, in the county of Essex, civil engineer, for his invention of certain improvements on machinery applicable to vessels propelled by steam or other power; which improvements, or parts thereof, are applicable to other useful purposes.—Sealed 22nd March—6 months for inrolment.

To William Westley Richards, of Birmingham, in the county of Warwick, gun maker, for his invention of certain improvements in primers for discharging fire-arms by means of percussion.—Sealed 22nd March—6 months for inrolment.

To John Cox, of the city of Bristol, of the firm of Hrding, Cox, and Shaw, soap manufacturers, for his

invention of certain improvements in the manufacture of soap, which will be particularly applicable to the felting or fulling of woollen cloths.—Sealed 22nd March—6 months for inrolment.

To Sir John Scott Lillie, Knight, and Companion of the Most Honourable Military Order of the Bath, of St. John's, in the parish of Fulham, in the county of Middlesex, for his invention of an improved mode of acquiring power for the purpose of propelling carriages, barges, and other the like contrivances for conveying goods and passengers.—Sealed 23rd March—6 months for inrolment.

To John Lionel Hood, of the town and county of the town of Newcastle-upon-Tyne, gentleman, and Andrew Smith, of Princes-street, Leicester-square, in the county of Middlesex, engineer, for their invention of an improved mode of manufacturing belts, bands, and straps, to be employed in place of ropes or chains, and for other useful purposes.—Sealed 26th March—6 months for inrolment.

To William Blurton, of Field Hall, near Uttoxeter, in the county of Stafford, gentleman, for his invention of an improved method of and apparatus for extracting milk from cows and other animals.—Sealed 26th March—6 months for inrolment.

CELESTIAL PHENOMENA, for April, 1836.

D.	H.	M.	
1			Clock before the ☉ 3m. 53s.
—			☽ rises 6h. 9m. A.
—			☽ passes mer. morn.
—			☽ sets 5h. 47m. M.
	9	6	♃'s first sat. will em.
	10	27	Ecliptic oppo. or ○ full moon.
	13	28	☿ in conj. with ♂ diff. of dec. 1. 23.
	—		Occul. κ Virg., im. 10h. 7m., em. 10h. 49m.
	—		Occul. θ Virg., im. 16h. 39m., em. 17h. 11m.
2	22	27	♄ in conj. with ☾ diff. of dec. 1. 19.
4	6	8	☿ in Perihelion.
	14		☽ in Perigee.
5			Clock before the ☉ 2m. 40s.
—			☽ rises 11h. 57m. A.
—			☽ passes mer. 2h. 49m. M.
—			☽ sets 6h. 57m. M.
7			Occul. τ Sagitt. im. 16h. 42m., em. 17h. 57m.
	21		♀ in Perihelion.
8	4	1	☽ in □ or last quarter.
10			Clock before the ☉ 1m. 15s.
—			☽ rises 3h. 52m. M.
—			☽ passes mer. 7h. 49m. M.
—			☽ sets 11h. 57m. M.
11	6	26	♅ in conj. with the ☽ diff. of dec. 4. 42.
12	13	22	☿ greatest Hel. Lat. S.
13	2	45	♂ in conj. with the ☽ diff. of dec. 3. 26.
	23	31	☿ in conj. with the ☽ diff. of dec. 1. 25.
15			Clock after the ☉ 0m. 3s.
—			☽ rises 5h. 15s. M.
—			☽ passes mer. 11h. 43m. M.
—			☽ sets 6h. 28m. A.
	11	3	Ecliptic conj. or ● new moon.
18			Mercury R. A. 0h. 58m. dec. 4. 9. S.
—			Venus R. A. 4h. 39m. dec. 24. 38. N.
—			Mars R. A. 0h. 6m. dec. 0. 30. S.
—			Vesta R. A. 11h. 40m. dec. 14. 42. N.

D.	H.	M.	
18			Juno R. A. 7h. 18m. dec. 14. 5. N.
—			Pallas R. A. 21h. 10m. dec. 9. 37. N.
—			Ceres R. A. 22h. 38m. dec. 16. 59. S.
—			Jupiter R. A. 6h. 40m. dec. 23. 22. N.
—			Saturn R. A. 14h. 4m. dec 9. 41. S.
—			Georg. R. A. 22h. 22m. dec. 10. 55. S.
—			☿ passes mer. 23h. 14m.
—			♀ passes mer. 2h. 53m.
—			♂ passes mer. 22h. 18m.
—			♃ passes mer. 4h. 53m.
	9	50	♃'s fourth sat. will em.
19	8	15	♀ in conj. with the ☽ diff. of dec. 0. 27.
20			Clock after the ☉ 1m. 12s.
—			☽ rises 6h. 51m. M.
—			☽ passes mer. 3h. 32m. A.
—			☽ sets morn.
	10		☽ in Apogee.
21	13	50	♃ in conj. with the ☽ diff. of dec. 3. 46.
	14	11	♃ in oppo. to the ☉
23	9	48	♃'s second sat. will em.
24	2	45	☽ in □ or first quarter.
	9	21	♃'s first sat. will em.
25			Clock after the ☉ 2m. 11s.
—			☽ rises 11h. 43m. M.
—			☽ passes mer. 7h. 42m. A.
—			☽ sets 3h. 2m. M.
—			Occul. η Leonis, im. 7h. 58m., em. 9h. 2m.
—			Occul. γ Virg., im. 12h. 25m., em. 13h. 23m.
30	4	50	♄ in conj. with the ☽ diff. of dec. 1. 8.
	6	7	♀ greatest Hel. Lat. N.
	14	24	☿ in sup. conj. with the ☉
	—		☽ eclipsed, invisible.
	—		Occul. λ in Virg., im. 8h. 40m.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR FEBRUARY AND MARCH, 1836.

1836.	Thermo.		Barometer.		Rain in inches.	1836.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low.	
Feb.						March					
26	39	18	28,97	28,91		11	47	36	29,14	29,06	,025
27	38	31	28,96	28,91	,35	12	46	37	29,30	29,20	,125
28	39	27	29,33	29,21	,025	13	50	34	29,59	29,47	,225
29	39	25	29,48	29,36		14	49	40	29,31	29,17	,2
March						15	47	34	29,36	29,01	,6
1	47	34	29,25	28,84	,025	16	46	29	29,94	29,64	
2	50	35	29,51	29,34	,35	17	52	32	30,02	29,87	,125
3	49	35	29,69	29,57		18	61	45	30,24	30,19	
4	47	31	29,65	29,34	,025	19	63	41	30,13	30,07	
5	44	38	29,41	29,32	,025	20	65	32	30,16	30,02	
6	48	26	29,32	29,18	,2	21	53	40	30,07	29,93	
7	49	26	29,36	29,33		22	52	42	29,87	29,83	
8	41	32	29,46	29,32		23	53	23	29,72	29,46	
9	44	25	29,43	29,23	,075	24	49	32	29,47	Staty.	,1
10	46	33	29,35	29,25	,025	25	47	35	29,13	28,87	,15

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

JOURNAL AND REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. L.

Recent Patents.

To John Malam, *of Kingston-on-Hull, in the county of York, civil-engineer, for his invention of certain improvements in gas-meters, and in the apparatus for generating gas for illumination.*—[Sealed 2d June, 1835.]

These improvements in gas-meters, and in the apparatus for generating gas for illumination, consist, in the first instance, in a new and simple arrangement of the parts constituting the meter, and in the mode of suspending it, whereby the friction or resistance of the water employed in the common meters is considerably overcome, and the working parts of the machine are much less exposed to injury from the chemical action of the impregnated water, there being but a small portion of the cylinder by which the gas is measured im-

mersed in the water. It will be perceived, that as the friction is diminished by my improved arrangement, the rotary velocity of the meter is increased; consequently, a much smaller machine will be required for the passage of a given quantity of gas than those of the ordinary construction. Secondly, the improvements in the apparatus for generating gas for illumination, consist in an addition to the retort commonly in use for the purpose of effecting a more perfect decomposition of the vapour arising from the coal in the process of distillation, and rendering that part which would otherwise be condensible into tar and ammonia into a permanent elastic gas, thereby greatly increasing its quantity, and rendering the gas of a more pure and better quality.

Retorts of the ordinary construction with my improvements may be worked at a much lower temperature than usual, as that portion of the vapour which passes off from the first process of distillation is perfected by the second, and thus the durability of the retort is considerably increased; which advantages are obtained from the ordinary quantity of coal, and at no additional labour or expense in the mode of heating or working.

For the better illustration of my improvements, I have attached two sheets of drawings, marked with several figures and letters of reference, for the purpose of pointing out the several parts more particularly. Plate V. exhibits several views of the improved meters adapted to two different varieties of situation; the one being a small meter made on the plan which I should recommend for registering the consumption of a small number of lights, and the other showing the construction which I prefer to employ where the passage of a large quantity of gas is required to be measured, and also

my proposed additions to the retorts now commonly in use, which I call a "generator." In this apparatus the gaseous vapour is submitted to a second process of distillation, and thereby improved in its quality as well as increased in quantity.

Fig. 1, represents an elevation of my improved meter, on the construction I propose to be employed to register the consumption of gas for a small number of lights up to eight or ten; fig. 2, being a sectional elevation taken through the middle of the machine; fig. 3, is a plan or horizontal view, as seen from above, the top or cover being removed, the better to show the interior; and fig. 4, represents another plan of the same, the drum or cylinder of the meter being shown in a vertical position, that the passages for the gas may be more distinctly seen.

Fig. 1, *a*, *a*, *a*, represents the outer casing of the meter; *b*, the pipe for the ingress of the gas, connected with the chamber and upright central pipe *c*, *c*. There is a tube *d*, *d*, surrounding the upright pipe *c*, which is supported by the annular float *e*, *e*, *e*; and the pipe *d*, *d*, is so constructed that it will support the footstep or bearing of the axis of the meter, which is seen within the upright pipe *c*. It will be seen that the shaft or axis of the machine is supported at the top by the arms or frame *g*, *g*, in connexion also with the annular float *e*, *e*: hence it will be evident that as the float is always horizontal, the angle of the inclination of the axis of the meter will be invariable. The drum or cylinder of the meter is shown at *h*, *h*, *h*, and is mounted at the proper angle of inclination, which is shown in the drawing at about one-fourth of its diameter, and of course may be varied at pleasure. It will be seen in the sectional elevation, fig. 2, that the height of the

water which is represented at *i, i,* must meet the lowest point of the inner circumference of the top of the cylinder *h, h*; and the lowest point of the bottom edge opposite will dip into the water sufficiently to seal the gas and prevent its escape, except through the proper passages, from one division of the cylinder to the other. The different compartments of the cylinder, with their passages, will be more clearly seen by reference to figs. 2, 4, and 5.

The gas proceeding through the fixed pipe *c,* into the central chamber *k,* of the cylinder, from whence it passes in radial directions to the circumference, through the four passages *l, l, l, l,* on the top of the cylinder, into the segmental passages *m, m, m, m,* next the outer circumference of the cylinder, which are so divided that the gas passes into the four inner compartments *n, n, n, n,* (see fig. 5,) which is shown inverted, ascending on the one side, and is discharged as it descends on the opposite side. The passages for the ingress and egress of the gas, and the four compartments through which it passes to be measured, are marked with corresponding figures; that is to say, that as the gas proceeds from the central chamber *k,* through l^1, on the top of the cylinder, it thence passes through the circular divided passage m^1, to the compartment n^1, in the cylinder, and so on, and is discharged at the opposite point to which it is received, and which is further shown by the direction of the arrows. In case the water should decrease by evaporation, or otherwise, it will be seen the float and meter will descend with the surface of the water until its progress is arrested by the valve *o,* suspended from the footstep of the shaft *f,* in the pipe *c,* falling upon its seat *p,* which will entirely exclude the admission of the gas until a further supply of water is given. At the

bottom of the chamber *c*, in the opposite direction to the entrance of the gas at *b*, I connect a pipe *q*, for the purpose of drawing off the condensation or other liquid which may accidentally be deposited in the central chamber *c*, *c*. After the gas has been measured as above explained, it rises from the water into the case *a*, *a*, from whence it passes off through the branch pipe *r*, to the burners. The mode I propose to register the gas as it proceeds through the meter is as follows:— To the axis *f*, of the cylinder I affix a worm *s*, which actuates a wheel *t*, affixed upon the arms or frame *g*, *g*, of the float. To the shaft of the wheel *t*, is affixed a rod *u*, having an universal joint at each end, which accommodates the wheel *t*, to the ascent or descent of the meter. To the other extremity of the rod *u*, is a small axis passing through a stuffing-box, and carrying the pinion *v*, which actuates the two count wheels *w*, *w*; the back wheel being mounted upon a fixed centre, and the front wheel being fixed upon the boss of the hinder wheel which carries the index or hand, and thus registers the consumption of the gas, which will be marked upon the front wheel carrying the dial. Supposing the worm to have a single thread taking into the worm-wheel *t*, of fifty teeth, affixed to the shaft *u*, carrying the pinion *v*, which has five teeth working into the two wheels *w*, *w*; the one having two hundred and forty-six teeth, and the other two hundred and forty-seven teeth; it is evident that six hundred and ten thousand revolutions of the meter cylinder being accomplished before two wheels *w*, *w*, have effected an entire change, will thus register ten thousand cubic feet of gas.

Fig. 6, is a side view of the cylinder of the meter, showing the exit passages of the gas from the compartments n^1, and n^4. Fig. 7, is a segmental section taken

through the middle of the gas passages *m*, at their exit. Fig. 8, is a front elevation of a gas-meter on the construction I propose to be used for meters of a large capacity, and where a great quantity of gas is intended to be passed. As the diameter of the cylinder of the meter is increased, supposing it to be revolving upon a fixed centre, as above described, the friction occasioned by its action through the water would retard its motion. This difficulty I propose to obviate by the following arrangement, the cylinder and its passages being upon the same construction as the one above described. In this instance, however, the cylinder does not revolve upon its axis, but has an oblique shaft fixed at the upper end to a rotary crank arm, the lower end of the shaft forming a pivot bearing upon a step, on which it travels with a conical rotary movement, giving to the cylinder a circular undulating motion.

It may here be observed, that these two modes of suspending the meter may be slightly varied, as I do not intend to confine myself to them in particular, as it may be suspended in a similar manner to a ship's compass, which is so well known, that I do not think it necessary more particularly to describe it.

The peculiar action of the shaft *a*, of the cylinder of the meter, is determined by the crank *b*, which is mounted upon a separate axis placed exactly vertical with the foot of the shaft *a*, which bears in the steps *c*. It will be seen that as the gas rises into the cylinder of the meter through the inlet pipe *d*, it proceeds into the central chamber of the cylinder, and through the passages into the four compartments in succession, above described; and of course the compartments of the cylinder, which are in immediate connexion with the inlet pipe (by the pressure of the gas), will rise, and

communicate a rotary motion to the crank *b*, so that each compartment will be filled in succession, and also discharges the gas from the opposite compartments by their descent in succession into the outer casing *e, e*, of the meter, and from thence through the outlets to the burners, by the peculiar arrangement of the passages at the bottom of the case of the meter, through which the gas passes, shown in figs. 9, and 10.

It is evident that the meters must be fixed perfectly level, or the gas will not be able to enter at the inlet pipe: *g, g, g*, is the convolute passage for the entrance of the gas: this passage being partly filled with water will immediately become closed, provided the meter case is not fixed level, and thus the gas will be prevented from entering. The casing of this meter is also provided with a reservoir or fountain of water at the upper part *h, h*, for the purpose of supplying the meter to the proper level, in the event of the water therein becoming evaporated, or otherwise deficient. This fountain or reservoir is charged by removing the plug *i*, when the ball valve *k*, falls into its seat, and closes the supply pipe to the meter, when the water may be introduced to the fountain, and the plug replaced, which will act upon the lever of the ball valve, and open the supply pipe. The lower end of this pipe must be nearly at the level of the water in the meter case, and by any diminution of the water the open end of the supply pipe will become exposed to the action of the gas which will rise within it, and destroy the vacuum above the water in the fountain, and will effect a supply to the meter; and for the further regulation of the meter, provided the supply of water is not maintained by the fountain, or through the opening *m*, which is made for this purpose, I have affixed a float-valve *n*, within a case which is attached

to the meter (to which the branch of pipes for the ingress and egress of the gas are affixed); and it will be seen that as the water falls in the meter, the valve *n*, will descend, and close the passage of the gas. There is also an opening *o*, at the bottom of this case, for drawing off any condensation which may occur. The count wheels for registering the consumption of the gas are exactly upon the same principle as those for the meter, before described, and are seen more clearly in the horizontal or top view of the meter, fig. 11.

Fig. 12, represents a front elevation of three retorts, with their "regenerators" and conducting pipes; fig. 13, is a sectional elevation of the furnace, retorts, and regenerators, with their flues; and fig. 14, is a longitudinal section of the same: *a, a, a,* being the mouth of the retorts through which they are charged with coal; *b, b, b,* the connecting pipes through which the gas and vapour produced by the distillation ascends to the regenerators; *c, c, c,* are the mouth-pieces of the regenerators; and *d, d, d,* are the ascending pipes from which the gas passes to the hydraulic main *e*, and from thence it is conveyed to the condenser, purifiers, and gasometer, in the ordinary manner. It will be seen that the regenerators are fixed above the retorts, supported by an arch, with openings *f, f,* left for the purpose of transmitting the heat to them more readily, but not intended for the passage or draft of flame. The heat passes from the furnace *g, g,* circulating under the two lower retorts, and through the openings *h, h, h,* to the upper retort, above which it operates upon the regenerators through the openings *f, f, f,* above described; after which the current of flame passes through the flues at the extremity of the furnace, as seen at *i, i, i,* better shown in the horizontal section, fig. 15, and vertical section 16,

and from thence over the regenerators to the main flue, or chimney *k*, as will be seen by the progress of the arrows. It will be seen, by reference to the longitudinal section, fig. 14, that the coal under distillation in the retort is discharging its gas and vapour through the connecting pipe *b*, to the regenerator, which is furnished with an internal passable cylinder *l*, *l*, left somewhat shorter than the generator, that the gas may pass out at its extremity into the body of the regenerator, and is thus submitted to the action of the heat therein. It will be seen that the internal cylinder has a mouthpiece *m*, separated from that of the regenerator for the purposes of adjusting it over the opening of the connecting pipe *b*, and cleaning it from any deposit; and the cylinder may be removed altogether at pleasure, and a fresh one substituted without disturbing the regenerators, that it may be more readily and effectually cleansed: after the gas has been submitted to the action of the regenerators, it passes off in a more perfect and pure state, through the ascending pipes *d*, *d*, *d*, to the hydraulic main *e*, as will be clearly seen in the figures.

For the better illustration of the regenerator, with its internal cylinder and connecting pipes, I have shown at figs. 17 and 18, the front or mouth end upon a larger scale; and the same letters of reference point out the corresponding parts to those shown in the above-named figures.

Figs. 19 and 20, show two different forms of regenerators, and an alteration of the mode of setting them. I wish it to be particularly observed, that by my improved process each retort is provided with a separate regenerator, which is heated by the same furnace as the retort; and this may be effected in various ways, the one

shown in the drawing being merely for the purpose of illustration.—[*Inrolled in the Rolls Chapel Office, December*, 1835.]

Specification drawn by Messrs. Newton and Berry.

To James Neville, *of Great Dover-road, in the county of Surrey, engineer, for his having invented an improved apparatus for clarifying water and fluids.*—[Sealed 9th September, 1831.]

There are several modifications of apparatus for filtering fluids proposed under this patent; in the first place, for clarifying foul water; and, secondly, for clearing beer and wines.

Plate V., fig. 21, exhibits in vertical section a vat or vessel for filtering water, at the bottom of which is placed a pan *a*, of porous, unglazed earthenware. This pan, of a conical form, is inverted, that is, placed mouth downward upon the bottom of the vat; it has notches in its rim to allow the water to pass through freely: a bandage of felt is, however, bound round the rim, for the purpose of preventing the filtering material from being carried through to the interior by the pressure of the water which occupies the vat. From the upper part of this pan, a pipe *b*, proceeds, by means of which the filtered water may be drawn off: this pipe is passed through the side of the vat, and is bent downwards, the Patentee says, for the purpose of allowing the atmospheric pressure to act with greater effect upon the surface of the water contained in the vat; but a short pipe with a cock would be sufficient for drawing off the water.

The lower part of the vat, on the outside of the pan,

is to be filled with the filtering material, consisting of coarse particles of grit or sand, to the height of two or three inches from the bottom, and above this is to be spread powdered charcoal, previously clarified by boiling in pure water. This charcoal is to cover the pan completely, rising a few inches above it, and is to be rammed down and levelled on its upper surface.

Upon the charcoal a piece of thick woollen felt is to be spread, and secured by tacking or cementing it to the inside of the vat; and upon this a plate of slate is placed, nearly fitting the interior. This plate is to prevent the filtering material being disturbed, either from the sudden descent of the water into the vat, or when the sediment or mud requires to be removed, which is to be discharged through a cock in the side.

In order to regulate the supply of water which is to be delivered into the vat, from a cistern or other reservoir, by the pipe *c*, a valve with a float is attached to that end of the pipe: this valve is shewn upon a larger scale, partly in section at fig. 22: *d*, is a tube to be screwed on to the end of the pipe, in the lower part of which there is an aperture closed by a small stone ball, or a Dutch marble *e*; a lever *f*, is mounted upon a fulcrum joint at the edge of the tube, the longer arm of which carries a hollow spherical float *g*, the shorter arm or tail of the lever acting against the under part of the ball valve *e*.

The weight of the spherical float *g*, when it is allowed to descend, causes the tail of the lever to raise the ball valve *e*, and permit the water to flow from the pipe into the vat; but when the water in the vat has risen nearly to the top, the spherical float rises with it, and thereby allows the ball valve *e*, to fall into the recess at the bottom of the tube *d*, and close the aperture.

This is the construction of float valve for supplying water invented by Mr. Bullock in 1820, (see vol. ii. page 127, of the London Journal of Arts, First Series); and as regards the ball *e*, falling into a socket to close the aperture, that is the subject of Mr. Read's patent in the same year (see vol. i. page 404, of the Journal): we are therefore at a loss to understand why this construction of float valve is set out in the present patent in the character of a new invention.

Fig. 23, represents a modification of the above described filtering apparatus proposed to be applied to ordinary cisterns or water-butts: *h, h*, is an earthen pan or vessel containing the filtering material, rammed hard, and covered by a felt and plate of slate on its top. This vessel is to be placed on the bottom of the cistern or water-butt, and within it another vessel or pan, *a*, as before, is to be inverted with a pipe *b*, leading from it for the discharge of the filtered water.

Another modification of filtering apparatus, for clarifying water on a larger scale, is shewn at fig. 24, which is a longitudinal section of a tank: *a, a, a*, are a series of semi-cylindrical earthen pans inverted on the bottom of the tank. The interiors of these pans are all connected to one longitudinal pipe *b*, which passes through the tank for the purpose of discharging the filtered water by a cock. This pipe may be carried down for the purpose of assisting the filtration, as before mentioned, but that is not convenient; it is intended to attach a pump in order to draw off the water.

The lower part of the tank between the pans is to be filled with Kentish rag, or any other porous stone reduced to small particles; and above this, clarified charcoal, pulverised as before, is spread upon the upper surfaces of the pans, filling up to a thickness of several inches deep,

which being rammed down hard, is covered with a woollen felt and slab of slate, in the same manner as first described.

The apparatus for clarifying malt liquors, oils, and other fluids, is shewn in vertical section at fig. 25: a cast-iron square cistern *a, a*, open at top, is intended to receive the liquor. The bottom of this cistern is of a conical form, and from its centre the discharge pipe *b*, descends to the distance of about twelve feet. A grating *c*, or false bottom, perforated with many holes, is placed at the lower part of the cistern, bearing upon the sides of the enclosed bottom: over this a covering of wire gauze is placed, on which a sheet of fine flannel or wash leather is laid, and upon the leather a bed of pure charcoal ground to powder. The bed of charcoal is covered with a thick woollen felt, and bearing upon this is a plate *d*, which fits the interior of the cistern. Above this, a circular brush *e*, is placed, having a perpendicular stem *f*. This brush is intended as an agitator, and receives rotary motion by means of a band and pulley, for the purpose of keeping the impurities of the liquor suspended, and preventing their accumulating on the surface of the plate or felt, but which may be discharged when required by an aperture and cock on the side.

The pipe *g*, conducts the liquor into the reservoir; and when such liquor (as beer) is subject to injury from exposure to the atmosphere, a floating board *h*, is placed upon the surface. This board is made to fit the interior of the vessel, and is packed on its edges like a piston, to prevent the passage of air, but rises and falls with the surface of the fluid.

A pipe *i*, furnished with a valve, is for the purpose of allowing the air to escape from the pipe *b*, and from the lower part of the cistern, the bottom of the pipe *b*, is

curved, for the purpose of holding a small quantity of liquor, in order to prevent the admission of air from below, when the apparatus is in operation.

The Patentee says, "if the descending pipe be twelve feet long, and the cistern be four feet square (or containing a surface of sixteen superficial feet), when the said pipe is filled with any fluid of the specific gravity of water, then, when that cock is opened, the atmosphere will act upon the surface of the fluid contained in the cistern with an immense force or pressure of more than five tons, or about eleven thousand six hundred pounds weight, whereby a large quantity of the fluid will be driven through the clarifying medium in a short time. The force or pressure thus obtained will always depend upon the altitude of the apparatus here described, or the depth of the descending pipe, and the specific gravity of the fluid operated upon: I vary such altitude and consequent pressure according to the nature of the fluid so operated upon, and the force necessary to effect its clarification in large quantities."

A portable apparatus for fining wine or beer is shown at fig. 26, which may be employed by publicans by attaching it to the ordinary beer-engine, in order to clarify the malt liquor as it is drawn: *a*, is a cylindrical vessel of malleable zinc, or other suitable metal, the lower part of which is formed conically, as shown by dots. This cone is perforated with a multitude of small holes as a colander, over the outer surface of which is to be drawn a cap of wash leather. The interior of this vessel *a*, is to be filled with pure charcoal, ground fine; and after placing a circular piece of porous leather on the top, the contents are secured by a conical cap *b*, screwed on to the upper end of the cylinder, from whence the pipe *c*, proceeds, which conducts the liquor to the beer-

engine. An external cylindrical vessel *d*, is attached to the lower part of the vessel *a*, above the cone; the bottom of this vessel *d*, is also conically formed, and has an outlet and valve for discharging the foul matter or sediment which may accumulate within. In the side of the vessel *a*, is the socket and pipe *c*, by which the liquor is conducted from the butt or cask, by means of what the Patentee terms a suction-pipe.

It will now be perceived that on the beer or other liquor being allowed to flow from the cask or butt, it will pass into the vessel *d*, and, by the action of the pump in the beer-engine connected to the pipe *c*, the liquor will be drawn through the perforated cone, and through the vessel *a*, and divested of its foul particles, by filtering through the purifying materials in the vessel *a*.

The Patentee says, that he can attach several pipes from this apparatus to distinct casks, and connect them to the pumps of the beer-engine, so as to draw the several different liquors through this clarifying apparatus: he has not, however, shown the means by which he can do this, nor does any such means appear at all obvious.

In applying the last described apparatus to the clarifying of wine, instead of connecting a pump, as before, to the vessel *a*, a syphon tube *f*, is to be attached to the pipe *c*, and exhausted in the usual way. The longer leg of this syphon must be inserted into the cask or vessel below, intended to receive the clarified liquor; and this vessel must be air-tight, except at the hole of the vent-peg.

Not perceiving any particular features of novelty in the apparatus described above, we hoped to have been relieved by a specific claim, but that is not to be found in the specification. The Patentee only states,

that he does not confine himself to making his apparatus of any particular dimensions, forms, or materials; and he disclaims the exclusive use of charcoal, stone, or sand, as a clarifying material, those matters having been used for that purpose for more than half a century: the public are therefore left to discover in what the invention consists, and we are at a loss to instruct them in this instance.—[*Inrolled in the Inrolment Office, March*, 1832.]

To SAMUEL BURRELL, *of Birmingham, in the county of Warwick, manufacturer of gilt toys, for his invention of an improved method of manufacturing buttons for clothes.*—[Sealed 16th February, 1835.]

THIS invention applies particularly to that description of buttons called Florentine buttons, or those which are covered with silk, cloth, or any other fabric, having either cloth or metallic shanks; which improved method consists in connecting or uniting the various parts of the button in a new way, viz. by confining the discs and other parts of the button after they have been brought together by means of a soft metal rivet in the centre, or by a compressed bow shank, instead of connecting the parts by overlapping the edge, as in the ordinary construction of Florentine and other covered or shell buttons. The pieces of metal forming the front and back discs are made and united without any turned-up edges, and are fastened together, holding the Florentine or other covering material between them, merely by the outspreading of the metal stem or shank itself, which forms a rivet under the cloth by means of spreading out the metal, or by the compression of the bow shank

effected by a punch and press in the act of connecting the parts, thereby securely fastening together the front and back metallic discs, and the Florentine or other covering material.

In order that my invention may be better understood, I have exhibited in the accompanying drawing (see Plate VI.,) several figures of my improved buttons, and sections of some of the various punches and dies, or tools used in the same, although I do not intend to confine myself to the precise form there shown, as, under circumstances in manufacturing different sorts of buttons, they must necessarily be varied; and I would also remark, that these buttons may be made in the usual manner, with the aid of the common fly or stamping press, or any other machines constructed to perform the various operations required in manufacturing these buttons.

Fig. 1, is a face view of a cloth or Florentine button; fig. 2, is a back view of the same, showing a flexible shank; fig. 3, is an edge view; and fig. 4, is a section taken vertically through the button, the several parts composing the button being shown detached in the following figures. A piece of metal intended to form the front disc *a*, is, in the first instance, punched out of thin sheet metal of the proper size, having a hole in its centre, as at fig. 5; the edge of this hole is then countersunk by a small die and punch into the shape shown at fig. 6, which is a front view; the back of the same is represented at fig. 7, and an edge and sectional view at figs. 8 and 9. Fig. 10, shows two different views of a cylindrical piece or plug of lead or other soft metal *b*, intended to be passed through the central hole, and to form the connecting rivet: the disc *a*, is then placed in

the die A, shown at figs. 11 and 12. Fig. 11, being a plan, and fig. 12, a section of the die, and B, is its punch: the disc *a*, then occupies the situation in the die shown in fig. 13, the leaden plug being inserted through the aperture of the disc into the cup *c*, of the die A; and the punch B, on being brought down with a quick stroke, either by a hammer or a fly-press, rivets the metal into the recess or countersunk formed round the hole in the centre of the front disc *a*, even and flush with its face.

The front disc, with its shank plug of lead fixed to it, is shown in the several figs. 14, 15, 16, and 17, and is now ready to be covered. The disc for the back of the button is formed of a piece of thin sheet metal, as shown at *d*, fig. 18, which is then to be dished and countersunk, and perforated in the centre by proper tools, and made to assume successively the forms represented in the several front, back, edge, and sectional views at figs. 19, 20, 21, 22, 23, 24, and 25. The flexible or cloth shank *e*, is formed by cutting out in any convenient manner a piece of the common shanking cloth of the shape shown at fig. 26, which is afterwards, by a small countersunk die and round-headed punch, pressed into the form shown in the plan, side, and sectional views, figs. 27, 28, and 29. The piece of Florentine or other covering material is represented at fig. 30, and may be cut out of the cloth by a punching-press or machine, or by hand, in any convenient manner.

Having now shown and described the various parts separately, I shall proceed to explain how they are put together so as to form a complete button. The piece of Florentine or other covering material is first placed flat in the recess *f*, at the top of the collar C, fig. 13; and upon this disc of Florentine is placed the front metal

disc *a*, having a leaden plug *b*, as described at figs. 15 and 16, which is represented at fig. 32. Both the parts of the button thus placed are then forced down the cylindrical recess of the collar C, by the sliding piece D, fig. 31, until it has reached the bottom, and will then appear with the edges of the Florentine puckered round, as in fig. 33. The closing tool D, is now to be furnished with one of the back discs, as fig. 23, having one of the raised flexible shanks (figs. 27 and 28,) placed through the hole in the centre, in the manner shown at figs. 33, 34, 35, and 36: the closing tool D, fig. 33, is then forced down into the hollow of the die C, its bevelled edges gathering in the edges of the Florentine or other covering material under the back disc in the usual way; at the same time, the flexible shank being brought over the leaden plug *b*, and its edges held between the back and front discs, it is then confined, as represented in the sectional view, fig. 37, until the riveting punch descends to press the whole together. The riveting punch E, which is slightly dished in the centre, is then brought down with a proper stroke of the fly-press or hammer pressing upon the back disc, and also upon the end of the leaden plug, which pressure spreads out the end of the soft or leaden plug into or over the countersunk recess in the back disc, as shown at fig. 38; thereby securely riveting and fastening the whole of the parts together, and forming the complete button, as first represented in figs. 1, 2, 3, and 4. The punch E, and closing tool D, are then withdrawn from the die C, and the button forced out of the die in the usual way, or by the rising of the bed F: from this last riveting punch and die the buttons may be passed to a flattening die, as shown in fig. 39, where they may be subjected to such pressure as to make them as flat and neat as required.

The buttons with the bowed wire shanks are formed in a somewhat similar manner, the metal composing the shank being outspread or compressed into a recess or countersunk hole in the back disc in the following way.

Figs. 40, 41, 42, and 43, are representations in different positions of one of these improved buttons, with a bowed wire shank. The front disc *a*, is formed out of the thin sheet metal in any convenient manner, having a small hole in its centre, which need not be countersunk: this disc is shown at fig. 44. The bowed wire shanks *b*, are to be first made of an oval or elongated form, as represented in two positions at fig. 45. The ends of the wires are then passed through the hole in the front disc, as shown in fig. 46; after which, the oval or looped part of the shank is placed in a pair of common shanking clamps or tools, and the ends opened and outspread, or riveted flush with the face of the disc *a*, by a hammer or punch; thereby firmly uniting the shank with the front disc, as shown in figs. 47 and 48. The back disc *c*, is punched out of thin sheet metal, having a hole formed through its centre, as represented at fig. 49, and is then dished and countersunk by proper-shaped punches and dies, in the form shown in the back and sectional views, figs. 50 and 51: the piece of Florentine or other covering material is then to be laid in the cup or collar of a die, and the front disc with the shank (covered by a piece of shanking cloth, cup-shaped, as at *c*, if desired) then placed upon it, as described before, in reference to the flexible shank, and the whole being forced down the hollow of the die by a tube or hollow tool into the position shown at fig. 52. The closing tool G, is then furnished with one of the back discs, and brought down into the hollow of the die, gathering in and confining the edges of the Florentine

or other covering material under the back disc, as shown in fig. 53, the metal shank protruding through the hole in the back disc: the punch H, is then brought down with a proper stroke of the press, and its hollow or countersunk recess meeting with the bow of the oval shank compresses it, outspreading its sides into the cup or recess in the back disc, as shown in fig. 54; thereby connecting or confining the whole of the parts firmly together, as shown in the complete button figures, 41 and 42.

I would here remark, that although I have described this my improved method of manufacturing buttons without mentioning the application of paper between the front disc and Florentine or other covering material, in order that this simple method of connecting the front and back discs and other parts of the button might be better understood, yet it must be evident that paper or any other material may be placed between the front disc and the Florentine, if desired; and I prefer using discs of thin paper of somewhat less than the piece of covering material.

Having now described my improved method of manufacturing buttons for clothes, I wish it to be understood that I do not claim any of the parts of the buttons separate, or which may have been before known and used; nor do I claim any of the tools, dies, or punches used in manufacturing the same, as they may be varied, to suit the shape or kind of button required, or the taste and will of the manufacturer; but I do claim, in the first instance, the method above described, of uniting the front and back parts or discs of the button solely by the outspreading or riveting of a soft metal plug under the fabric, which constitutes the flexible shank, as above described; and secondly, in closing or confining the disc

and coverings of a button solely by the outspreading of the bowed wire shank without overlapping the edges of the discs.—[*Inrolled in the Rolls Chapel Office, August,* 1835.]

Specification drawn by Messrs. Newton and Berry.

To Alexander Stocker, *of Yeovil, in the county of Somerset, gentleman, for his invention of improvements in machinery for manufacturing horse-shoes, and certain other articles.*—[Sealed 14th April, 1835.]

This invention consists, first, in improvements in preparing the iron for making horse-shoes, and also for making shoes for mules and asses, by means of rollers, as hereafter described. Secondly, in improvements on machinery for bending prepared iron into shoes for horses, and also for mules and asses.

Plate VI., fig. 1, represents a pair of rollers constructed according to my invention; fig. 2, is a transverse section; fig. 3, is an end view of the same; and fig. 4, is a longitudinal section of the lower roller. I have not thought it necessary to show the framing necessary to carry these rollers, such framing being similar to that usually employed for ordinary rollers for rolling iron: *a*, is the upper roller, and *b*, the under roller; *c*, *c*, are pinions on the axes of the rollers *a*, and *b*, for the purpose of causing them to revolve correctly together. In constructing horse-shoes, as well as shoes for asses and mules, it is usual to form grooves or recesses for the reception of the heads of the nails. Fig. 5, shows a horse-shoe having the grooves or recesses *d*, *d*, formed one on each side of the shoe, and near to the

outer edges thereof. These grooves *d, d*, like those produced in making shoes by hand, do not proceed all round the shoe, but there are spaces *e, e*, for the heel, and the space *f*, at the front part of the shoe of the thickness of the bar. The object of the first part of my invention is the use of rollers so constructed that they will produce bars of iron, having such grooves *d, d*, and spaces *e, e*, and *f*, at proper intervals; whereby such bars, when divided into suitable lengths, each such length will contain parts grooved and parts ungrooved proper to make a shoe, such as is shown at fig. 5. In addition to the grooves *d, d*, some description of shoes are made with a bevelled edge on the side which comes against the foot, such as at *g*, in fig. 6.

In order to produce bars of iron, the two sides of which resemble those shown at figs. 7 and 8, I construct rollers in the following manner: *h, h*, are longitudinal openings or hollow spaces from end to end of the roller *b*. It will be seen by the various figures, that the roller *b*, has three grooves, each to receive a bar of iron; whilst the roller *a*, has three projecting rims, which enter into and work within the grooves formed in the roller *b*. In each of the grooves formed in the roller *b*, are formed openings to receive the moulds *i, i*; such moulds being accurately fitted to the openings in the grooves of the roller, and such moulds are retained in their places by having tail-pieces affixed thereto, which have keys or wedges *j*, passed through them, as is clearly shown by the various figures in the drawing. The object of these moulds is to produce the grooves *d, d*, at proper intervals. On the projecting rings *k*, of the roller *a*, are formed projecting surfaces *l*, in order to produce the bevelled edge, as shown at *g*, in fig. 6.

Having thus described a pair of rollers suitable for

preparing bars of iron, having the two sides similar to those shown at figs. 7 and 8, I would remark, that on the size of the shoes will depend the size of the rollers, and also the distances at which the moulds *i, i*, are apart: these will readily be apportioned by a mechanic after a careful examination of this description, together with the foregoing figures in the drawing; and it will be evident that rollers capable of producing similar effects may be constructed in various ways. I do not, therefore, confine my invention to the use of rollers constructed precisely in the manner here shown, but intend to avail myself of such variations as will suit the varied forms of shoes desired; always keeping in mind the chief property of my invention, that of rollers capable of producing bars of iron for making horse, ass, and mule's shoes, having the grooves *d, d*, and the impressions *g*, formed thereon at proper intervals, and without such grooves *d, d*, or impressions *g*, continuing without interruption throughout the bar.

Fig. 9, shows another construction of rollers; fig. 10, being a transvere section; fig. 11, a longitudinal section; and fig. 12, an end view of the same. In this instance, however, the projecting rings *k*, on the upper roller *a*, are plain, and consequently produce a plain surface to that part of the shoe which comes against the foot.

The moulds *i, i*, for making the grooves *d, d*, are similar to those before described, but are affixed by dovetail grooves in the circular plates *l*: for it will be seen by this drawing, the roller *b*, in this instance, is made up of a series of plates *l, l*, and *m, m*, which are securely retained together by the screw-bolts *n*, and they are prevented from turning on their axis by the keys *o, o*, all which will be very evident on inspecting the drawing;

and it will at the same time be observed, that in this instance the impression or bevelled edge *g*, is produced on the same side of the bar as that on which the grooves *d, d*, are formed. In this instance, as in the former case, the rollers will produce such grooves and such impressions or bevels at suitable intervals, in order that each division of the bar, when divided, shall be proper for making a shoe, with the requisite grooves *d, d*, in their proper places; also the spaces *e, e*, and *f*, and also the bevelled edge *g*.

Fig. 13, represents another pair of rollers; fig. 14, is a transverse section; fig. 15, is an end view; and fig. 16, is a longitudinal section of the lower roller. The construction of these rollers differs from those before described, inasmuch as they are solid metal. The moulds *i, i*, for producing the grooves *d, d*, being formed in the act of making the rollers, and constitute part thereof, the metal being removed between the moulds *i, i*, in order to omit grooving the bars of iron at those places or spaces which are to form the heels and front of the shoe. It will also be seen that the bevelled portion *g*, of the side of the shoe which comes against the foot, is throughout the width of the shoe, as is clearly shown by fig. 17; and fig. 18, shows the other side of the bar of iron having the grooves *d, d*, formed thereon, and also the plain surfaces *e, e*, and *f, f*.

From the foregoing description of the rollers used to produce the object of my invention, a workman will readily be able to arrange or construct rollers to produce bars of iron suitable for making shoes for horses, asses, and mules, according to the various sizes and patterns desired for the market.

I will now describe the second part of my invention. Fig. 19, represents a side elevation of a machine for

bending iron into the form of shoes; fig. 20, is a plan of the same; fig. 21, is a back view; and fig. 22, is an end view of a part of a machine. In these figures the same letters are used to indicate the same parts: A, being the framing of the machine, its arrangement and construction will be evident on inspecting the various figures in the drawing; B, is the bed plate; C, is the main or driving shaft, which receiving motion by the pulley or drum D, transmits the same to the various parts of the machine by the pinion E, taking into and driving the cog wheel F, which is affixed to the shaft G, which turns in suitable bearings in the framing of the machine, on to the shaft G, are affixed the bevelled toothed wheels H, one at each end; which wheels H, take into and drive the bevelled toothed wheels I, affixed on the crank shafts J, J; which crank shafts have suitable bearings affixed to the side framings A, of the machine, as is clearly shown in the drawings.

On to the bed B, are affixed guides K, inclining to each other, in order that the compressing instruments L, which slide therein, may approach each other as they are driven outwards by the connecting rods M, which are actuated by the cranks J, J, as will readily be understood by inspecting the various figures of the drawing; and it will be seen that the connecting rods M, have the means of adjustment in their length by screws and nuts, as is well understood: N, is a table or plate of metal affixed on the bed B, of the machine; O, O, are two guides, between which the length of iron (heated in preference) to form the shoe is laid, as shown by dotted lines, at the time that the compressing instruments L, are drawn back.

The compressing instruments are connected to the rods L, by pin joints, as shewn in the drawing; thus

allowing of movement to accommodate the rods to the working of the cranks J, J. On the upper part of the sliding portion of the compressing instruments there are plates *l*, *l*, having slots to allow of adjustment; these plates *l*, *l*, being securely held down by screw bolts and nuts. The plates *l*, *l*, have rollers P, P, turning on axes: these rollers are driven along the length of iron, and cause it to bend round the die or mould Q, as will be readily understood by examining the plan, fig. 20.

The mould or die Q, is capable of rising, in order to remove the shoe in like manner to similar dies or moulds used for what are termed heels and shoe-tips, as is well understood. The horse, ass, and mule shoes being thus prepared, are to have holes punched as usual, and are to be fitted to the particular feet by hammering, as heretofore. And it may be further remarked, that where additional thickness of metal is required at the front and heel, in addition to leaving those parts ungrooved, as is mostly the case with the shoes for the hind feet: this may be effected by sinking those portions of the rollers from the correct circle, whereby such additional thickness may be produced.

Having thus described the nature of my invention, and the manner of combining the various parts, I would remark, that I do not claim any of such parts in their separate condition, nor in combination, other than is hereafter more distinctly pointed out and claimed: and I would remark, that I am aware that iron has before been prepared by means of rollers for making horse-shoes, the grooves of which run continuously along the bar or lengths of metal; I do not, therefore, lay claim to the use of rollers generally for preparing iron for horse, ass, and mule's shoes; but I do declare that I confine my claim of invention, first, to

the preparing iron for horse, ass, and mule shoes, by means of rollers with the grooves *d*, *d*, produced at proper intervals, having spaces *e*, and *f*, left ungrooved, as above described, and having the bevelled edges *g*, *g*, produced at proper intervals, as above described. Secondly, I claim the mode of working the two compressing instruments within guides, which stand at an angle to each other, whereby such compressing instruments approach each other as they are forced outwards by the connecting rods, as above described.—[*Inrolled in the Inrolment Office, October*, 1835.]

To John Holmes Bass, *of Hatton-Garden, in the county of Middlesex, gentleman, for his having invented certain improvements in machinery for cutting corks and bungs.*—[Sealed 3d June, 1830.]

There appears to be no subject connected with the mechanical arts which so completely bids defiance to machinery as the art of cutting corks. The peculiar properties of the material, its elasticity, and the gritty matters incorporated in its substance, appear to have rendered it impossible to produce by machinery any thing like the same result which is effected by the hand of a skilful workman. The yielding substance of the cork causes it to shrink from the edge of the knife, and the grit which continually opposes itself to the cutter blunts the edge of the best-tempered steel, and renders the application of a sharpener to restore the edge of the knife indispensable after every cut, or nearly so. Hence, notwithstanding the many attempts which have been made, no piece of mechanism has yet been produced

capable of performing the work of cork-cutting in a way that is considered satisfactory.

In the inrolled specification of the above invention, the machine is exhibited in four elaborate sheets of drawing, which are explained by eleven closely written skins of parchment; but as the object to be effected by this invention (the cutting of corks) is one that appears to be impracticable, we do not consider it necessary to set out in a graphic form the complicated details of this machinery, a concise description of its general features and mode of operating being sufficient to render the nature of the invention evident.

The machine, in some degree, resembles a foot lathe. A frame of cast-iron supports a crank-shaft and fly-wheel, which are actuated by a treadle below. This shaft carries a pulley, and bands from this pulley give motion to the operating parts of the machine.

A pair of clams or holders are mounted in arms or levers (one of the arms sliding) upon an axle in front. They are brought together by a spring for the purpose of holding or confining the ends of a square piece of cork to be placed between them when intended to be operated upon. The levers are made to move upon their fulcrums to and fro, for the purpose of advancing the cork toward the cutter, and withdrawing it after the operation is done.

The cutter is a straight blade of thin steel mounted in a frame at the back of the machine. It is raised a little at one end, in order that the cork may be cut to a slightly conical shape. The cork held between the clams is made to revolve with its clams by a band and pulley communicating with the crank shaft, and is, with its frame, brought forward towards the cutter by means

of mechanism connected also with the said shaft, which, as before said, are worked by a treadle.

The piece of cork brought thus against the edge of the cutter, and made to revolve, its angles and inequalities are shaved off by the edge of the cutter, which is itself simultaneously slidden towards the cork in order to assist the operation. When the cork has been shaved down to a cylindrical or slightly conical figure, the levers with the clams are thrown back and opened by rotary cams, which allows the finished cork to fall down into a receptacle below, and another square piece of cork may then be put in to be operated upon in like manner.

If it should be desired to cut corks or bungs of an oval shape, that may be done in this machine by raising and depressing the frame in which the cutter is mounted during the operation; and to effect this object an excentric wheel on the main shaft of the machine may act upon levers or arms supporting the cutter-frame.—[*Inrolled in the Inrolment Office, December,* 1830.]

To THOMAS DE LA RUE, *of Finsbury-place, in the county of Middlesex, fancy stationer, for his improvement or improvements in manufacturing or preparing embossed paper-hangings.* — [Sealed 15th August, 1834.]

THE Patentee commences his specification by stating, that attempts have been made to use embossed papers for hangings, or covering the walls of rooms, but that owing to the damp of the paste used in putting up such

embossed paper, the beauty and effect of the embossed parts have been subject to injury, and frequently have been altogether destroyed: his object, therefore, is to remove this inconvenience by preventing the damp of the paste acting upon the paper; and to do this he proposes to cover the back of the paper, as a guard, with an oily or water-proof preparation, as common house paint. A further object is also proposed, viz. that of giving a particular embossed pattern to papers which shall produce the effect of satin stripes.

The manner of carrying these objects into effect are as follows:—Before the paper is embossed, it is to be covered on the back with a sufficient coat of size made from glue; and when this size has become dry, the paper is to be embossed in the ordinary way. After embossing, the back of the paper is, by a brush, or other convenient means, to be painted upon the preparation of size with a composition of oily materials or varnish; by these means the moisture of the paste, which will be employed in attaching the paper to the walls, will be prevented from affecting the embossing.

A suitable compound of materials proposed to be employed as the guard against damp, may be prepared in the following proportion:—Ten pounds of white lead properly ground up in oil, as for paint, which is to be mixed with one pint of drying oil, one pint of spirits of turpentine, and one pint of japanner's gold size. The Patentee does not, however, confine himself to this particular compound, as spirit varnish might answer equally well.

The compound, when properly mixed, is to be laid on the back of the embossed paper, one or more thickness being applied, as may be found desirable, which will render the paper proof against the watery parts of

the paste; and when so prepared, it must be hung up in a drying room in a temperature of 75° or 80° Fahrenheit.

The second feature of the invention is described as consisting in "embossing or impressing a series of lines parallel to each other in the way of the length of the paper-hanging, that is to say, when such paper-hangings are applied to a room, such lines shall be at right angles to the floor."

The object of these lines is described as intended to obtain a brilliant effect, from the light acting upon the paper when placed upon the walls, in the same way as on what are termed *watered silks.*

The manner of effecting this is by passing the paper between indented rollers in a press, the rollers being engraved with straight or wavy parallel lines, so as to produce those lines or indentations lengthwise of the paper, in order that they may be at right angles to the floor when hung against the wall. If the embossed paper is to have what is termed a *watered* pattern, then parallel lines, agreeable to the pattern, must be engraved upon the embossing roller in a cross direction to the former lines.

The operation is to be performed in an ordinary embossing press by an engraved roller (why an engraved plate is not alluded to, which is one of the ordinary modes of doing this, we do not know), but the invention appears to be confined within exceedingly narrow limits. The following are the words of the claim:—"I would have it understood, that I lay no claim to the embossing of paper, such process being well known, and in use for book-binding, paper-hanging, and a variety of other purposes; nor do I claim the parts of the apparatus for giving the lines as described: but I do hereby confine my claim of invention, first, to preparing the

backs of embossed paper-hangings with spirit or oily substance, suitable for resisting the moisture contained in paste used for sticking such paper on the walls of rooms, whereby such embossed paper-hangings will retain the sharpness and beauty of the embossing; and, secondly, I claim the production of paper-hangings with embossed parallel lines in the way of the length of the paper; that is, in such manner, that when the paper-hangings are pasted on the walls, such lines run upwards at right angles to the floor, as above described, and thereby an increased beauty of effect will be obtained from the light playing or acting upon the surface of the paper."—[*Inrolled in the Inrolment Office, February*, 1835.]

A patent for "improvements in manufacturing paper intended to be applied to the covering of walls, or the hanging of rooms, and in the apparatus for effecting the same," was granted to Mr. Thomas Cobb, of Banbury, dated 15th September, 1829 (see our Second Series, vol. vi. page 253). The particular features of that invention were the employment of embossed papers for the covering or hanging of rooms, which were made to resemble embroidered or damask silks. M. De la Rue appears to have precisely the same object, and to carry it into effect in the same way; the only feature of novelty is that of coating the back of the embossed paper with paint, in order to prevent the embossed pattern being injured by the damp of the paste. Now, supposing the adaptation of embossed papers, made to resemble damask silk, to be new, of which we believe there is no question, as respects the hanging of rooms, a subsequent Patentee must not suppose that by the introduction of what may be considered an improve-

ment, he can ride over the original invention; and with reference to the second feature of M. De la Rue's patent, supposing the process common property, that mode of producing a damask in imitation of silk must necessarily resolve itself into the invention of one single pattern, the same having been, to our knowledge, very successfully done by Mr. Cobb, by various other directions of lines and stripes, both straight and wavy, diagonally and transverse; and what is claimed by M. De la Rue is described by Mr. Cobb under the term striping, which every manufacturer of fine goods knows must run the lengthway of the piece.—Ed.

To William Newton, *of Chancery-lane, in the county of Middlesex, civil engineer, for a method of preparing animal milk, and bringing it into such a state as shall allow of its being preserved for any length of time, with its nutritive properties, and capable of being transported to any climate, for domestic or medicinal uses; being a communication from a foreigner residing abroad.*—[Sealed 11th March, 1835.]

The method of preparing animal milk, and bringing it into such a state as shall allow of its being preserved for any length of time with its nutritive properties, and capable of being transported to any climate for domestic or medicinal purposes, consists in simply evaporating the aqueous parts from the liquid milk, and leaving the other constituent parts of the milk in a concentrated state, unaltered by any chemical change, which I effect in the following manner:—Taking the milk in a fresh state as drawn from the animal, having first strained it, if necessary, to get rid of any dirt or other improper

matter which may have accidentally fallen into the pail or other vessel while milking: I introduce into the milk a small quantity of pulverised loaf sugar, say from one-fiftieth to one-hundredth part in weight of the whole quantity of the milk, which quantity may however be greater, dependant upon the desired sweetness of the preparation when completed. On the sugar becoming perfectly dissolved, I subject the milk to tolerably rapid evaporation, either by blowing through the milk warm or cold air, by means of suitable apparatus of any convenient form, such, for instance, as those at present in use for evaporating syrups, or by means of external warmth in connexion with a vacuum above the surface, produced in any of the ordinary ways as applied to evaporation. By whatever process, however, the evaporation is carried on, the milk may, with advantage, be subjected to a gentle warmth to quicken the operation; but that warmth will be best obtained from hot water, or from steam or heated air, applied to the outside of the vessel which contains the milk, as the direct action of fire upon the vessel may tend to injure the properties of the milk, and perhaps give it an unpleasant flavour. By evaporating the aqueous parts of the milk in this way, its nutritive or essential parts may be concentrated, and its substance reduced to the consistency of cream, honey, or soft paste, or even into dry cakes or powder; and may in the latter states be kept exposed to the air for a length of time without being impaired, the sugar tending to preserve it.

By dissolving the milk so prepared in a proportionate quantity of warm or cold water, the original milk is reproduced with all its properties, original flavour, and salutary qualities.

It is desirable to dilute the concentrated milk at first in a small portion of water, and to add afterwards the

necessary quantity to bring it into the liquid state; otherwise it would be difficult to dissolve the milk completely.

This process of preparing milk, affords the means of conveying it without injury to any distance in any climate, and of retaining by concentration the delicious flavour of the milk peculiar to one country, and reproducing it in another with its original qualities.

When evaporated to the consistency of paste, it may be taken as food by persons who, on account of the weakness of their digestive organs, cannot take milk in its liquid state.

It is obvious that every kind of animal milk may be prepared in the same manner, whether it comes from the cow, the goat, the ass, or even from the human breast.

When evaporated to the consistency of a syrup, it may be put in bottles or phials; when concentrated to the consistence of honey, in suitable pots; when brought to that of a thick paste, it may be shaped into lozenges, or dried and reduced to powder. Milk so prepared may, without losing any of its properties, be afterwards combined with any medicinal, aromatic, or nutritious substance.

When reduced into powder, milk may be advantageously mixed with cocoa, and dried into cakes; and by diluting it with warm water, will give excellent chocolate.

When brought to the consistence of honey, it may be mixed with a strong infusion of coffee, or of tea; and being further evaporated, will keep, and afterwards yield, when dissolved with warm water, coffee, or tea of the usual strength and flavour.

This improved method of preparing milk is essentially different from all preparations of milk heretofore

known; and is particularly unlike the preparation described by Mr. Braconneau, inasmuch as milk prepared upon his plan is decomposed; while by my process it is only concentrated, without being chemically changed.

The process of Mr. Braconneau consists in separating, by means of an acid, the serum from the other constituents of milk, and adding to the residuum (viz. the caseum and the butyrous substance) a sufficient quantity of carbonate of soda, to render it soluble in liquid. The milk so prepared must be re-composed for use, but it never can be brought to the perfect flavour and condition of real good milk, as many of its original properties are necessarily destroyed or modified, however exact the analysis, and however great the skill of the operator: on the contrary, the milk thus prepared by me undergoes no chemical change, but concentrated by its constituent substances are merely driving off or evaporating the aqueous parts; and the milk, with all its original flavour and nutritious qualities, will be again restored by the addition of simple water.—[*Inrolled in the Rolls Chapel Office.*]

Specification drawn by Messrs. Newton and Berry.

To JOHN JOSEPH CHARLES SHERIDAN, *of Walworth, in the county of Surrey, chemist, for an improvement in the manufacture of soap.*—[Sealed 17th September, 1835.]

THE Patentee describes his invention in his specification as consisting of the application of calcined black flint, sand, or other siliceous matters, in combination with

caustic soda leys, or caustic potash leys, to the manufacture of soap. He then proceeds to describe the manner of manufacturing the detergent mixture, or combination of calcined flint and caustic potash leys, or caustic soda leys, which he proposes to carry into effect in the following manner:—He first takes one part by weight of black flint, and reduces it by wet grinding, between two horizontal stones, to an almost impalpable state; after which he mixes it with two parts of caustic soda leys, or caustic potash leys, and boils the two ingredients together for about eight hours, keeping them continually stirred or crutched (a term well known to soap manufacturers), for the purpose of more intimately mixing the two ingredients, until they are brought into one homogeneous mass of a saponaceous character; and then the ordinary ingredients for the manufacture of soap, such as tallow, &c., after they have been cleansed in the ordinary manner, are placed in a tub or vat, and the detergent mixture is poured pail-full by pail-full into it, care being taken that the whole should be well stirred or crutched for the purpose of well mixing it after one pail-full is put in, and before the next is poured into the tub.

The Patentee here observes, that the ordinary saponaceous materials and the detergent mixture should be about the same temperature; and he also observes, that the quantity of the detergent mixture supplied to the saponaceous materials must be entirely at the will of the manufacturer, as his experience will inform him how much he ought to pour in. The Patentee further observes, that the quantity of the detergent materials poured in, will be varied according to the quality and strength of the soap required to be made; and he also states, that he prefers to manufac-

ture the soap in quantities of about one ton at a time, as that is the most convenient quantity. It may also be worthy of notice, that the manufacturer should have a number of small vessels, capable of holding about half a pound, for the purpose of making experiments, as the respective quantities of the ingredients depend entirely upon circumstances, and the quality of the soap to be manufactured, as before mentioned. The Patentee also states, that he does not confine himself to the exclusive use of either calcined black flint, or sand; because any other siliceous material would answer the purpose equally well in the manufacture of soap; but he prefers calcined black flint, because the other sorts are either difficult and expensive to obtain, or they are too expensive in the manufacture before they are in a fit state to be mixed with the saponaceous materials.

The Patentee here observes, that if sand is to be used instead of flint, it should be well cleansed and washed, and then, with about twenty parts of water, it should be mixed with carbonate or sub-carbonate of soda, and it should then be calcined in a reverberatory furnace; after which, a quantity of carbonic acid gas must be injected, which will precipitate the siliceous matter: the liquid should then be run off, and it is then fit for use as a detergent mixture, for the purposes before mentioned.

The Patentee also observes, that he can do without the tub or vat in which the detergent and saponaceous materials are mixed, but not without considerable inconvenience: he therefore wishes it to be understood, that he does not claim that as part of his invention, nor does he claim the mixture of the calcined flint with caustic soda leys, or caustic potash leys, as that is not new; but he claims the combina-

tion of calcined black flint with caustic soda leys, or caustic potash leys, as a detergent mixture, to be used in the manufacture of soap, as before described.— [*Inrolled in the Inrolment Office, March*, 1836.]

SCIENTIFIC NOTICES AND NOVEL INVENTIONS.

FRANCE.—CONSUMPTION OF SUGAR.

The increase of the consumption of sugar during the last few years, is exhibited in the following table; the value is in francs:—

	Colonial Sugar.	Beet-root Sugar.	Total.
1825	61,255,232	4,000,000	65,255,232
1831	67,542,792	10,000,000	77,542,792
1832	62,669,638	15,000,000	77,669,638
1834	66,951,481	20,000,000	86,951,481
1835	69,000,000	30,000,000	99,000,000

—*Journal du Commerce.*

It may be inferred from this document, that the astonishing increase of beet-root sugar in France is a subject of just interest to our English agriculturists. In 1825 the quantity of Colonial sugar consumed in France was fifteen times greater than that of beet-root sugar; in 1831, 6.7 greater; in 1832, rather more than four times greater; in 1834, 3.3 greater; and last year, 1835, only 2 3 greater. It is obvious that this branch of French industry has been so improved in its processes of manufacture since 1825, that it has become an object of national importance, and of highly profitable agricultural pursuit.

The consumption of French Colonial sugar, which may be taken as nearly the whole production of their

colonies, has increased in the course of the preceding ten years about one-eighth: the increase of the production of beet-root sugar last year, is nearly eight times as much as in 1825, making an average proportionate increase in favour of beet-root sugar of 64.1. We have no doubt but that the higher temperature of the climate of France, as compared to that of England, is conducive to the production of a greater proportion of saccharine matter in the French beet-root, because a higher temperature is favourable to the development and conversion of the peculiar juices imbibed from the soil by the root of saccharine plants; but our capitalists and cultivators, upon a large scale, might, in all probability, find the raising of beet-root, even in this country, for the purpose of manufacturing into sugar, an object of most lucrative employment, especially by combining the late improvements adopted in the French processes.

In the course of the last few years, a number of patents have been successfully taken out in France for improved modes of manufacturing the beet-root sugar. The present quality and vast increase of the supply of this article, has lately attracted the and close zealous attention of the French colonists and merchants, who are striving to obtain the levy of a strong impost upon the manufacture.—*Ed. Lond. Journ. of Arts, &c.*

BEET-ROOT SUGAR.

The three Councils of Trade recently assembled for the purpose of considering the question of the duty upon sugars. The Minister of Commerce laid before the Councils an exposé of the relative production of sugar by the Colonies, and upon the native soil; and a statement of the imports, exports, and duties levied. In the course of the last year, the manufactories of beet-

root sugar had yielded equivalent to the value of 25,000,000 fr. (equal to a million sterling).

This quantity is about one-third of the annual consumption of the country; it is manufactured at the price of 35fr. the quintal; the colonies cannot furnish the quintal at less than 25fr. on the spot. There are now, 25,000 hectares of land in France devoted to the culture of beet-root; and in the districts chiefly devoted to that culture, the value of land has doubled.

A discussion ensued upon the proposition of subjecting beet-root sugar to a duty of 15fr. the quintal, and increasing the drawback on the exportation of refined sugars to 35fr. The Colonial interest strongly supported the propositon, which was opposed by M. Sylvester, Secretary to the Agricultural Society, and has not not been yet decided.—*Courier Francais, January.*

N. B.—The quintal is equal to 50 kilogrammes = to 112lbs—135 avs. = to the English cwt. avs. short 2½ ounces.

1lb. French is equal to 1.118.650lbs. English avs.

1lb. English avs. is equal to 0.893.931lbs. French.
—Ed. *Lond. Journ.*

MAXIMUM DENSITY OF WATER.

The question as to the temperature at which the density of water is a maximum, does not seem to be yet quite settled. Deluc first fixed it at 40° Fahr.; Sir Charles Blagden and Mr. Gilgrire reduced it to 39°; Birt reduced it to 38.15°; and the French, in fixing their standard weights and measures, adopted 40°. More lately, the elaborate researches of Hallstrom have fixed it at 39.38°; other German philosophers lower it to

38.75°. Mr. Crichton, of Glasgow, has more recently, and by accurate experiments, fixed the true point of maximum density at 38.97°; consequently, the point at which water acquires *the same absolute magnitude*, as at 32.0°, is 45.94°.—*American Journal*, vol. xxviii. No. 2, p. 357.

GALLIC ACID.

Dobereiner obtains pure gallic acid in a few minutes, by the following process:—A concentrated decoction of gall-nuts, mixed with a little acetic acid to decompose the gallate of lime, is shaken for one minute with a quantity of ether. The gallic acid is taken up by the ether; and by spontaneous evaporation on a watch-glass, is obtained in small colourless prisms. If longer digested, the liquid separates into three portions: the highest contains the gallic and acetic acids, if the latter be present in excess; the next an ethereal solution of tannin, and the heaviest the water and extractive matter.—*Ibid. Report of the British Association.*

ACETIC ACID.

A most important improvement has recently been introduced into the manufacture of vinegar, which is already extensively practised on the Continent. The introduction of this improvement is stated to be chiefly due to Mitscherlich. It is founded upon the principle, that alcohol, by absorbing oxygen, is changed into acetic acid and water. For two parts alcohol + four parts oxygen = one acetic acid + three water. This oxydation is promoted by the process of fermentation; and when the fermentation has began, is much accelerated by the presence of acetic acid. As the oxydation is effected entirely at the expense of the oxygen of the

atmosphere, as many points of contact as possible between the liquid and the air should be established. To effect this, the following arrangement is adopted:— An upright cask is used, pierced at the bottom with holes, and provided with a stop-cock; this vessel is filled with chips or shavings of wood. A shallow cylindrical vessel, pierced with holes partially stopped by twigs, which pass through the bottom holes of the cask, is then filled with alcohol diluted with eight or nine parts of water mixed with a fermenting substance. This diluted liquor gradually trickles through the shavings from the containing cylinder placed over the cask; and becoming oxydized in its passage, it runs out by the stop-cock into a recipient below, *already converted almost entirely to vinegar.* Glass or other tubes, fixed in the cylinder, carry off the carbonic acid, &c. evolved. The temperature rises during the process to 86° Fahr. A second process, through a similar cask, finishes the operation in about twenty-four hours.—*Ibid.*

CONSUMPTION OF THE FRENCH COLONIES.

The annual average consumption by the French Colonies, of articles imported into them from France, is calculated at about 50,000,000 of francs (equal to about two millions sterling), divided as follows:— Wines and liquors, 6,000,000fr.; oils, 2,400,000fr.; jewellery, 500,000fr.; paper, 500,000fr.; pottery and glass, 500,000fr.; skins, in a variety of shapes, 25,000,000fr.; iron ware, 1,600,000fr.; cotton, thread, silk, woollen, and felt manufactures, 20,000,000fr.; grain and flour, 3,000,000fr.; and miscellaneous articles, 13,000,000fr.—*Galignani's Messenger, Jan.* 1835.

CHURCH OF THE MADELEINE.

This is one of the most superb specimens of modern architecture of which any European city boasts. Its site is on the Boulevard Madeleine, near the end of the Rue St. Honoré. This elegant national monument was commenced by Napoleon before his reverses. Its architecture is pure Grecian, and in the Corinthian order, composed of lofty marble columns, which form the portico, and run round the cella of the building. The Polytechnic annals state, that this splendid work of art is completed in its exterior sculpture, and that the interior decorations are in a state of forwardness. A square is forming in front of the edifice.

IRON RAILWAY TO VERSAILLES.

The above is a project of MM. Vergier et Bayard. It is proposed to commence it at the "Place de la Concorde," at the west end of the Tuileries' Gardens. It will follow the course of the River Seine, cross the Bois de Boulogne, and proceed by St. Cloud to Versailles; the whole route will be about twelve miles; the estimated cost six million francs.—*Ibid.* p. 159; *Rec. Ind.* No. 11.

SILK-WORMS.

The French Minister of Commerce, upon the recommendation of M. Beauvais, manager of the experimental establishment at Villeneuve St. George, for rearing silk-worms, has decided to send, at the expense of the Government, an agent to China for roots and cuttings of the different species of the white mulberry cultivated in that country, in order that an attempt may be made to naturalise them in France. He is also to bring with him the eggs of different varieties of silk-worms, selecting those which produce cocoons of the

most delicate whiteness and texture. The example set by M. Beauvais has been followed in several departments; and the Prefect of La Loire et Chère has awarded two prizes for the two most considerable plantations of mulberry trees within his district.

NOCTURNAL FRAGRANCE OF PLANTS.

The peculiarity of certain plants which emit their aroma in the evening, has much occupied the attention of botanists. The Œnothera Biennis (evening primrose), which is indigenous, and grows abundantly on the western shores of this island, particularly in Lancashire, and in some counties of Wales, exemplifies this singularity. In summer, soon after twilight, the flowers of the different species of the Œnothera expand and burst with great force; and as the evening advances, their delicate odour, at first scarcely perceptible, becomes more pungent and powerful. The Polianthus Tuberosa, so prized for its delicate beauty, its elegant flowers, and charming fragrance, is another example of nocturnal expansion and emission of its aroma. This beautiful plant, in a hot summer's evening, will occasionally emit sparks or scintillations of a pale flame colour, darted with excessive rapidity and momentum, and at the same time the odour of the flowers is extremely powerful,—its intensity becomes unpleasant.

These electric phenomena take place at a high temperature, and when the atmosphere is evidently highly charged with the electric fluid.

FRANCE.—POLITICAL ECONOMY.—MEMOIRS, &c.

The third question submitted to the consideration of the Commission, was upon the subject of cattle. This, as not interesting to our general readers, we shall pass with a short notice. The number of cattle imported

into France has gradually diminished within the last ten years. In 1833, 10,000 oxen, 10,000 cows, and 83,000 sheep, were imported. The largest and fattest cattle are introduced from Baden and Wurtemberg, and the import duty augments the price of meat about one halfpenny per pound. English horses, and others imported to France, pay a duty of 50f., about 2*l.* each. The discussions principally concerned the conflicting interests of some of the interior departments of France. We proceed to the fourth question.

SALTPETRE.

This subject is like the last, not particularly bearing upon British manufactures, we therefore shall merely notice a few of its points. Under a convention made in 1815, England reserves the right of shipping by her vessels all the saltpetre exported from our East India settlements to any foreign place. The nitrate of potass employed in the manufacture of gunpowder, is a declining branch of internal production in France. For many processes the nitrate of soda imported from Chili is preferred, as it contains a greater proportion of nitric acid, but it is not fit for the manufacture of gunpowder. It is proposed to continue the provisional duty of 52fr. 50c. per 100 kilogrammes, about 1*l.* 1s. the cwt., upon the importation of British Indian saltpetre, and to lower the duty upon Chili saltpetre to 25fr.: excepting as a notice of the proposed duties, the subject is not interesting to English readers.

Note.—Last week, the French Chambre des Deputés finally fixed the import duty upon foreign cast iron; it is reduced from 8fr. to 7fr. per 100 kilogrammes, *i. e.* from 80fr. to 70fr. the ton. Cast iron rails for roads are included in this new duty.

ARTIFICIAL ULTRA-MARINE, BY ROBIQUET.

Introduce into a stone-ware retort, luted with clay, a mixture of one part of kaolin, oneand a half parts of sulphur, and one and a half parts of pure and dry carbonate of soda, which must then be heated gradually so long as any vapours are disengaged; leave the retort to cool, break it, and there will be found in the interior a spongy mass of a very fine green colour; but on attracting moisture from the air, it gradually passes to a blue. Break and wash the mass, the excess of sulphate dissolves, and there remains a very beautiful blue. Wash this substance by decantation, dry and calcine it anew in a cherry-red heat, in order to expel the excess of sulphur. The blue thus prepared is of a fine agreeable colour, something under the intensity and azure blue reflection of the preparation by Gurmet; but this difference is not objectionable, as, in particular cases, painters will find it desirable to avail themselves of a preparation of a less degree of intensity than ultramarine, although equal to it in brilliancy, and capable of being presented at a much lower price.—*Acad. des Sciences. Ann. des Mines*, tom. v. p. 381.

MANUFACTURE OF CARBONATE OF SODA, BY PRUCKNER.

Commence by changing the calcined sulphate of soda into sulphuret of sodium, by heating it to redness with pulverized charcoal. Dissolve the sulphuret, and add to the warm liquor oxide of copper. Filter and evaporate the liquor to the sp. gr. of 1.41, or 1.48. On leaving the solution from twenty-four to forty-eight hours, the undecomposed sulphate of soda crystallizes. Evaporate the supematant fluid to dryness. This process gives for one hundred parts of sulphate of soda about sixty-

five of crude caustic soda. To convert this into carbonate of soda, it is heated gradually to redness with charcoal.

Metallic copper, as well as its oxides, may be used to separate the sulphur from the sulphuret of sodium, but on the large scale the protoxide is preferable. In order to procure this oxide, heat the metallic copper to redness, and plunge it into water containing in solution 0.02 of the nitrate of soda of Chili. The sulphuret of copper derived from this manufacture, mingled with one-sixth of powdered sulphur, is easily transformed into a sulphate by roasting.—*Ann. de Schweigger. Ann. des Mines,* tom. v.

FRENCH AND FOREIGN STATISTICS.

Upon this most important subject an interesting memoir, from the pen of M. Emile Bères, has been addressed to the "Council-General of Manufactures." It urges upon the French Government the necessity of the establishment of "a Statistic Board," to be attached to the administration of the Home and Foreign Department, in two distinct branches. The Memoir asserts, that the pressure of foreign competition upon the trade of France is principally owing to the almost total want of modern statistical information, not only amongst the mass of merchants, manufacturers, artisans, and agriculturists of France, but to nearly an equal degree amongst their statesmen and politico-economical writers. M. E. Bères observes, "That which is wanting to France, to expedite her progress in arts and manufactures, and to render her energies profitable in every branch of industry, is neither the talent of conception, nor *habileté d'exécution*, nor the genius necessary for the accomplish-

ment of great enterprises, but an exact knowledge of what has been done before us—of that which is accomplishing at this moment—and, above all, of the means to be adapted to our wants, whether such knowledge is to be attained from internal or external sources.

"It should be proclaimed that this deficiency of statistical information is the origin of the evil which at present extends itself throughout France. The statesman has no solid base upon which to rest his plans; the political economist is embarrassed and discouraged by the uncertainty of our geographies, encyclopædias, and statistical works—even foreigners reproach us with their errors; the manufacturer is without guides as to the quantity and qualities of his fabric, required in rival markets; the merchant is without information to direct his proceedings; and the agriculturist pursues the most opposite plans of cultivation, without rule and without profitable result." This general state of confined knowledge in France, is contrasted with the immense advantages derived in England from the universal cultivation of statistical information, and the resources found in the able public documents rendered available to all classes in the British isles. "No one," says the author, "can calculate the extent of injury which our carelessness to know what passes beyond our frontiers occasions to our national interests. We still hold to our degenerate races of domestic animals, whilst the English horse, by its strength, its symmetry, and its agility, is the admiration of nations. The sheep of Spain and of Saxony, the improved races of horned cattle, to which we have nothing equal, are not in our pastures! English industry, aided by processes with which even at this moment we are unacquainted, places our manu-

factures at an immeasurable distance!!"—*Annales de Statistiques*, p. 65; *Recueil Industriel, No.* 10.

We have thought it of importance to give the preceding notice of this able memoir, in order to direct the attention of our manufacturers to the principles of national improvement in France, which are operating changes that must to a certain extent affect eventually our productions, and their vent in foreign markets.

PARISIAN COMPANY OF WATCH-MOVEMENT MANUFACTURERS.

It may not be generally known to our artists in this branch of trade, that not one in ten of the French watches or time-pieces bearing the names of Parisian makers is constructed by them. The train or movement is made up in foreign parts; at Geneva, Nuremburg, Strasburg, &c.; and the cases, fittings, and ornamental parts, are executed by the Parisian workmen. The above noticed Company has been lately formed, for the purpose of associating native artists, and of manufacturing the entire movements of clock and watch-work at their respective homes. The Society is to be con ducted upon the most economical principles: the administration is to be formed of officers serving gratuitously; all the operations of the members are to be conducted upon the principle of division of labour; the only public workshops are to be those in which the movements are to be put together and mounted. If this Association carries its object into effect, it will produce a great change in this branch of foreign commerce. —*Annales de la Société Polytechnique*, p. 138; *Rec. Ind., No.* 10.

RHEIMS—UNDERTAKING FOR WELL-BORING.

A Company is projected by M. Houzeau Muiron, a manufacturer and able chemist of Rheims, for the above object. The cloth-workers and dyers of this city, are subjected to great inconveniences from the waters of their wells being generally charged with carbonate of lime, and other saline matters. The object of this Association is to procure water for domestic and manufacturing purposes from the main springs, and at the same time to examine by the borings the geology of the substrata, and to ascertain the probability of the existence of coal-mines in the vicinity of Rheims. —*Ibid.* p. 138.

PAINTED BINDING.

Many beautiful subjects may be formed on the sides of books by the workman skilled in painting. The volume is prepared by being paste-washed, so as to present an uniform fawn colour, the designs slightly traced, and afterwards coloured according to the pattern; the colours being mixed to the proper shade, with water. The shades must be tried on pieces of refuse leather, as, being spirit colours, when once laid on, no art can soften them down if too strong; and a peculiar lightness of touch will be necessary to produce effect. Portraits, &c. may also be executed in this manner; and many superb designs have at times been executed by the best binders of this country and France. M. Didot, bookseller, of Paris, presented a copy of the "Henriade," published by himself, to Louis XVIII., most elegantly ornamented in this style. It was executed by M. Bullier, bookbinder, of Tours, and presented on one side a miniature portrait of Henry IV., and on the other, a similar one of Louis XVIII.; both

perfect likenesses. The greatest difficulty consisted in the portraits, which were first imprinted on paper, very moist, and immediately applied to the cover, on which they were impressed with a flat roller. When perfectly dry, they were coloured with all the art of which the binder was capable, and the other ornamental paintings executed by hand. This proceeding requires great care in the execution, and will be applicable to any design where the binding will justify expense.—*Mech. Magazine.*

EXPERIMENTS FOR THE SAFETY OF THE STEAM-ENGINE.

Under the Act of the 30th of June, 1834, authorising the Secretary of the Navy to make experiments for the safety of the steam-engine, and appropriating five thousand dollars for that purpose, many proposed improvements have been submitted for the purpose of being tested by experiments: some of these were so easily tested by those having steam-engines in operation, that the aid of Government was not needed; others were attended with greater difficulty, and could not be tested without the expense of constructing boilers and other machinery for the purpose. These proposed improvements have not been such as to warrant a large expenditure of money, and no experiments have been made upon them; such experiments, however, would have been made, if they could have been made without the expense of constructing engines. The Act seems particularly to require that the steam-engine devised by Benjamin Phillips, of Philadelphia, should be examined and tested; and that Mr. Phillips should be employed in making the experiments. Mr. Phillips was therefore employed to construct a model

engine, with boilers and other machinery, which he deemed necessary for the purpose of testing his improvements, which he brought to this district, where he remained several weeks making his experiments before many members of both Houses of Congress, before the officers of different departments, and others. I attended very carefully to these experiments, but have not been able to perceive in them any improvements increasing the safety of the steam-engine.—*Rep. of Sec. of Navy to Congress. Franklin Journal.*

NEW MATERIAL FOR CABLES.

A series of trials have lately been made at Paris, to ascertain the comparative strength of cables made of hemp and of the aloe from Algiers. These trials all turned to the advantage of the aloe. Of cables of equal size, that made of aloe raised a weight of 2000 kilogrammes; that made of hemp, a weight of only 400 kilogrammes.—*Franklin Journal.*

A PRACTICAL TREATISE ON LOCOMOTIVE ENGINES UPON RAILWAYS,

With practical Tables founded on a great many new Experiments; and an Appendix, showing the expense of conveyance on the Liverpool and Manchester Railway. By Chevalier F. M. G. De Pambour, during a residence in England for scientific purposes. 8vo. pp. 365, with Plates. Weale, Holborn.

This is a work which must have called forth the most laborious and unremitted exertions of a highly-talented mind; it contains a series of important facts relating

to the practical part of locomotion, which, if ever obtained before, are now for the first time introduced to the public. The author considers, and very truly so, that he has taken up, if not altogether a new subject, at least the subject upon new ground, and has treated it in a way that will be found to afford very considerable information to the practical engineer.

The construction of locomotive engines, though sufficiently set out, does not form the prominent feature; the more abstruse parts of the philosophy of the subject, as steam, pressure, friction, traction, velocity, fuel, and proportions, are the vital parts of the work; and these are handled with such an experimental knowledge, and the facts so clearly developed, that the reader, whether practically acquainted with locomotion or not, will inevitably derive considerable information from a perusal of these pages.

The scheme and object of the work the author has set out in his introduction in the following words:—

"The plan we intend to follow in the course of this work will, we hope, render it both clear and methodical. We shall begin by the description of a locomotive engine: and we shall acquaint the reader with the means by which the pressure of the steam may be accurately measured; so that before we go any further, he will be able to see the elements from which the power of the mover we are to employ is derived.

"Our attention will afterwards be directed towards the resistances which that mover must overcome in its motion, so that we shall successively endeavour to discover as well the resistance of the waggons, as that which belongs to the engine itself, either when it moves alone or when it draws a load after it.

"These points first established, we shall pass to the general theory of the movement of locomotive engines, and we shall lay down the formulæ, by which to determine *à priori*, either the speed the engine will acquire with a given load, the load it will

draw at a given speed, or the proportions which are to be adopted in its construction to make it answer its intended purpose.

"After that we shall have to consider several additional dispositions proper to the engine, which may exercise more or less influence on the expected effect; and we shall then also treat of some external circumstances, the result of which may be of the same nature.

"Lastly, we shall speak of the fulcrum of the motion, or of the force of adhesion of the wheel to the rails; and our last chapter will contain a calculation of the quantity of fuel required for the traction of given loads.

"These inquiries will be sufficient to solve all the most important questions concerning the application of locomotive engines to the draft of loads.

"They will sometimes be necessarily subdivided into several branches, and require calculation and theoretical illustrations, of more or less extent, though always plain and easy, and a series of experiments more or less numerous; but we shall take care to maintain, all along our work, the classification we at present lay down."

The author has followed up this plan in a very comprehensive manner, and we confidently recommend this work to the perusal of our readers.

List of Patents

Granted in Scotland in April, 1836.

To Luke Hebert, of Paternoster-row, London, civil engineer, for certain improvements in mills or machines for grinding and sifting farinaceous and other substances.—23rd March.

— John Brecaton, of West Bromwich, engineer, for certain improvements in the construction of retorts for generating gas for the purpose of illumination.—25th March.

To Miles Berry, of the Office for Patents, 66, Chancery-lane, London, civil engineer and mechanical draftsman (in consequence of a communication made to him by a foreigner residing abroad), for a certain improvement or certain improvements in the system, mode, or method of working engines for exerting mechanical power.—6th April.

— Joseph Chesseborough Dyer, of Manchester, machine maker, and James Smith, of Deanstone, Perth, cotton-spinner, for certain improvements in machinery used for winding upon spools, bobbins or barrels, slivers or rovings of cotton, wool, and other fibrous substances of the like natnre.—7th April.

— William Hale, of Greenwich, in the county of Kent, lately of Colchester, in the county of Essex, civil engineer, for certain improvements in machinery applicable to vessels propelled by steam or other power: which improvements or other parts thereof are applicable to other useful purposes.—11th April.

— John Birkby, lately of Hightown, but now of Upper Rawfolds, both of Liversedge, near Leeds, in the county of York, cardmaker, for improvements in machinery for making needles.—11th April.

— Frederick Chaplin, of Bishop Stortford, in the county of Herts, for an improvement in tanning hides and skins of certain descriptions.—11th April.

— Charles de Bergue, of Clapham-rise, in the county of Surrey, engineer, for certain improvements in machinery used for spinning and doubling yarn or thread manufactured from cotton or other fibrous material.—11th April.

— Frederick Edward Harvey, of the Horsely iron-works, in the parish of Tipton and county of Stafford, mechanical draftsman, and Jeremiah Brown, of Tipton, in the same county, roll-turner, for certain improvements in the process and machinery for manufacturing metallic tubes, and also in the process or machinery for forging and rolling metal for other purposes.—22nd April.

New Patents
SEALED IN ENGLAND,
April, 1836.

To William Gossage, of Stoke Prior, in the county of Worcester, chemist, and Edward White Benson, of Wichbold, in the same county, chemist, for their invention of an improvement or improvements in the process of making or manufacturing ceruse or white lead.—Sealed March 29th—6 months for inrolment.

To James Noble, the elder, of Mill-place, Commercial-road in the county of Middlesex, wool-comber, for his invention of certain improvements in the combing of wool and other fibrous substances.—Sealed 29th March—6 months for inrolment.

To Charles de Bergue, of Clapham-rise, in the county of Surrey, engineer, for his invention of certain improvements in machinery used for spinning and doubling yarn or thread manufactured from cotton or other fibrous material.—Sealed 29th March—6 months for inrolment.

To William Brindley, of Caroline-street, Birmingham, in the county of Warwick, paper-maker, for his invention of improvements in tea-trays and other japanned ware, and in the board or material used therein, and for other purposes.—Sealed 29th March—6 months for inrolment.

To Thomas Cockerell Hogard, of Castle-street, Holborn, in the county of Middlesex, light hat manufacturer, for his invention of certain improvements in hats, caps, and bonnets.—Sealed 29th March—6 months for inrolment.

To Andrew Parkinson, of Law Moor, in the county of Lancaster, over-looker of power looms, for an improved stretcher, to be used in or with hand or power looms, being a communication from a foreigner residing abroad. —Sealed 29th March—6 months for inrolment.

To Samuel Parlour, of Addiscombe-road, Croydon, in the county of Surrey, gentleman, for his invention of certain improvements applicable to sketching, drawing, or delineating.—Sealed 31st March — 6 months for inrolment.

To John Jeremiah Rubery, of Birmingham, in the county of Warwick, umbrella and parasol furniture manufacturer, for his invention of certain improvements in the making or manufacturing umbrella and parasol stretchers.—Sealed 7th April—6 months for inrolment.

To John Spurgin, of Guildford-street, Russell-square, in the county of Middlesex, doctor of medicine, for his invention of a new or improved ladder or machinery applicable to the working of mines and other useful purposes.—Sealed 7th April—6 months for inrolment.

To John Holmes, of Birmingham, in the county of Warwick, engineer, for his invention of certain improvements in the construction of boilers for steam-engines.—Sealed 7th April—6 months for inrolment.

To Thomas Ridgway Bridson, of Great Bolton, in the county of Lancaster, bleacher, for his invention of a certain improvement or improvements to facilitate and expedite the bleaching of linen and other vegetable fibres.—Sealed 7th April—6 months for inrolment.

To Robert Copland, of Brunswick-crescent, Camberwell, in the county of Surrey, esquire, for his invention

of improvements upon patents already obtained by him for combinations of apparatus for gaining power.—Sealed 9th April—6 months for inrolment.

To Miles Berry, of Chancery-lane, in the county of Middlesex, civil engineer, for new or improved apparatus or mechanism of marking down or registering the notes played on the keys of piano-fortes, organs, or such other keyed musical instruments, being a communication from a foreigner residing abroad.—Sealed 12th April—6 months for inrolment.

To Jacob Perkins, of Fleet-street, in the city of London, engineer, for his invention of certain improvements in steam-engines, and in generating steam, and evaporating and boiling fluids for certain purposes.—Sealed 12th April—6 months for inrolment.

To James Lemard, of Lincoln's-inn-fields, in the county of Middlesex, gentleman, for improvements in making or manufacturing soap, being a communication from a foreigner residing abroad.—Sealed 12th April—6 months for inrolment.

To Thomas Hodgson Leighton, of Blyth, in the county of Northumberland, chemist, for his invention of certain improvements in the converting sulphate of soda into the subcarbonate of soda or mineral alkali.—Sealed 12th April—6 months for inrolment.

To Joshua Bates, of Bishopsgate-street, in the city of London, merchant, for certain improvements in machinery for cleaning and preparing wool, being a communication from a foreigner residing abroad.—Sealed 16th April—6 months for inrolment.

To John Parkinson, of Rose Bank, in the parish of Bury, in the county of Lancaster, calico printer, for his invention of certain improvements in the art of block-printing.—Sealed 19th April—6 months for inrolment.

To Henry William Nunn, of Newport, in the Isle of Wight, lace manufacturer, for his invention of certain improvements in manufacturing or producing certain kinds of embroidered lace, parts of which improvements are applicable to other purposes.—Sealed 21st April—6 months for inrolment.

To James Pedder, of Radford, in the county of Nottingham, lace maker, for his invention of certain improvements in certain machinery for making, by means of such improvements, figured or ornamental bobbin-net lace.—Sealed 21st April—6 months for inrolment.

To Hamer Stansfeld, of Leeds, in the county of York, merchant, for machinery for a method of generating power applicable to various useful purposes, being a communication from a foreigner residing abroad.—Sealed 23rd April—6 months for inrolment.

To Edward John Dent, of the Strand, in the county of Middlesex, chronometer maker, for his invention of an improvement of the balance springs, and their adjustments, of chronometers and other time-keepers.—Sealed 23rd April—6 months for inrolment.

To James Fuidon, of Black Horse-yard, High Holborn, in the county of Middlesex, coach-smith, for his invention of improvements in apparatus for supplying water to water-closets.—Sealed 23d April—6 months for inrolment.

To George Augustus Kollman, organist of his Majesty's German Chapel, St. James's Palace, for his invention of improvements in railways and in locomotive carriages.—Sealed 23rd April—6 months for inrolment.

To Edward John Massey, of Liverpool, in the county of Lancaster, watch-maker, for his invention of improvements in railway and other locomotive carriages.—Sealed 23rd April—6 months for inrolment.

To Sampson Morden, of Castle-street, Finsbury-square, in the county of Middlesex, mechanist, for his invention of an improvement in making or in manufacturing triple-pointed pens. — Sealed 23rd April — 6 months for inrolment.

To William Taylor, of Smethwick, in the county of Stafford, engineer, and Henry Davies, of Stoke Prior, in the county of Worcester, engineer, for their invention of certain improvements in machinery or apparatus for introducing water or other fluids into steam-boilers or evaporating vessels; also for obtaining mechanical power by the aid of steam, and for communicating motion to vessels floating in water.—Sealed 26th April—6 months for inrolment.

To Thomas Aitkin, of Edenfield, in the parish of Bury, spinner and manufacturer, for his invention of certain improvements in the preparation of cotton and other fibrous substances, and in the conveyance of the same to roving frames, mules, throstles, or any other spinning or doubling machinery.—Sealed 26th April—6 months for inrolment.

CELESTIAL PHENOMENA, FOR MAY, 1836.

D.	H.	M.	
1			Clock after the ☉ 3m. 6s.
	—		☽ rises 8h. 0m. A.
	—		☽ passes mer. morn.
	—		☽ sets 4h. 38m. M.
	7	58	Ecliptic oppo. or ○ full moon.
	9	6	♃'s first sat. will em.
	12	54	☿ in the ascending node.
2	11		☽ in Perigee.
5			Clock after the ☉ 3m. 32s.
	—		☽ rises 0h. 17m. M.
	—		☽ passes mer. 3h. 42m. M.
	—		☽ sets 7h. 5m. M.
6	2	15	☿ in Perihelion.
7	10	49	☽ in □ or last quarter.
8	13	26	♅ in conj. with the ☽ diff. of dec. 4. 45. N.
10			Clock after the ☉ 3m. 51s.
	—		☽ rises.
	—		☽ passes mer.
	—		☽ sets.
	4	41	☿ ☽ in conj. with A in Tauri, diff. of dec. 0. 12. S.
12	3	53	♂ in conj. with ☽ diff. of dec. 1. 57. N.
15			Clock after the ☉ 3m. 56s.
	—		☽ rises 4h. 6m. M.
	—		☽ passes mer. 11h. 52m. M.
	—		☽ sets 7h. 54m. A.
	—		Eclipse of the Sun, partial.
	1	51	Begins. } Greenwich
	3	19	Greatest phase. } mean
	4	39	Ends. } time.
			Magnitude of the eclipse (Sun's dia. = 1.) 0,863 on the northern limb.
	2	7	Ecliptic conj. or ● new moon.
16			Mercury R. A. 4h. 42m. dec. 24. 21. N.
	—		Venus R. A. 6h. 49m. dec. 26. 5. N.
	—		Mars R. A. 1h. 25m. dec. 7. 57. N.
	—		Vesta R. A. 11h. 38m. dec. 14. 8. N.
	—		Juno R. A. 8h. 2m. dec. 14. 32. N
	—		Pallas R. A. 21h. 27m. dec. 12. 29. N.
16			Ceres R. A. 23h. 12m. dec. 14. 59. S.
	—		Jupiter R. A. 7h. 0m. dec. 23. 1. N.
	—		Saturn R. A. 13h. 56m. dec. 9. 1. S.
	—		Georg. R. A. 22h. 26m. dec. 10. 38. S.
	—		☿ passes mer. 1h. 5m.
	—		♀ passes mer. 3h. 11m.
	—		♂ passes mer. 21h. 47m.
	—		♃ passes mer. 3h. 22m.
	10	32	☿ greatest Hel. Lat. N.
	11	4	♀ Greatest elong. 45. 22. E.
	16	10	☿ in conj. with the ☽ diff. of dec. 0. 1. N.
18			☽ in Apogee.
	9	50	♃'s fourth sat. will em.
19	5	39	♀ in conj. with the ☽ diff. of dec. 1. 31. S.
		44	♃ in conj. with the ☽ diff. of dec. 4. 1. S.
	6	49	♀ in conj. with ♃ diff. of dec. 2. 48. N.
20			Clock after the ☉ 3m. 46s.
	—		☽ rises 7h. 9m. M.
	—		☽ passes mer. 3h. 58m. A.
	—		☽ sets morn.
23	5	55	☽ in □ or first quarter.
	9	48	♃'s second sat. will em.
24	9	21	♃'s first sat. will em.
25			Clock after the ☉ 3m. 24s.
	—		☽ rises 1h. 41m. A.
	—		☽ passes mer. 7h. 51m. A.
	—		☽ sets 1h. 58m. M.
	5	37	♅ in quad. with ☉
26	—		Occul. θ Virginis, im. 12h. 56m., em. 13h. 17m.
27	12	14	♄ in conj. with the ☽ diff. of dec. 0. 54. N.
29			Occul. δ Scorpii, im. 13h. 40 m., em. 14h. 47m.
30	4		Ecliptic oppo. or ○ full moon.
	19		☽ in Perigee.
31	3	49	☿ greatest elong. 23. 25. E.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR MARCH AND APRIL, 1836.

1836.	Thermo.		Barometer.		Rain in inches.	1836.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low.	
March						April					
26	46	31	29,41	29,17	,15	10	54	32	29,63	29,46	,05
27	49	23	29,50	29,37	,025	11	52	37	29,67	29,64	
28	47	31	29,17	28.68	,2	12	55	26	29,74	29,67	
29	45	33	29,69	29,45	,075	13	58	40	29,75	29,70	
30	52	40	29,67	29,33	,075	14	54	35	29,92	29,87	
31	47	37	29,82	29,61	,225	15	58	45	30,12	30,04	,075
April						16	58	25	30,08	30,03	
1	48	28	29,74	29,35		17	49	37	30,07	30,02	,1
2	49	31	29,97	29,61	,75	18	56	32	30,04	30,02	,05
3	42	27	30,16	29,87	,2	19	56	35	30,03	30,01	,025
4	49	28	30,24	Staty.	,025	20	54	42	29,94	29,81	
5	54	22	30,12	29,95		21	57	35	29,84	Staty.	,05
6	46	35	29,84	29,76	,125	22	61	41	29,84	29,73	,025
7	49	37	29,40	29,14	,05	23	52	35	29,84	29,73	,075
8	49	28	29,17	29,02	,425	24	50	38	29,84	29,65	,225
9	50	35	29,40	29,24		25	55	33	30,04	30,02	,175

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

JOURNAL AND REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. LI.

Recent Patents.

To ANDREW SMITH, *of Belper, in the county of Derby, millwright and engineer, for a certain improvement or improvements in printing-machines.* — [Sealed 18th March, 1835.]

THIS invention of a certain improvement or improvements in printing-machines, applies to that kind or description of letter-press or type-printing machinery, in which the impression is obtained from the forms of type on to the sheets of paper by travelling or locomotive printing cylinders, as they pass or roll over the forms of type in their passage from one end of the machine to the other, the forms of type being placed on fixed tables, and consists in certain novel features, additions to, or improvements on or in such printing machines.

The Patentee then states, that he does not mean or

intend to confine himself to the precise form or arrangements of the parts shown and described in his specification, as the same may be varied to suit different sized machines, and the nature or quality of the work intended to be performed. And he here remarks, that in order to render his improvements better understood, he has shown and described several parts connected therewith which are not new, and form no part of his invention; for instance, the frames or framework of the machines, the beds or tables on which the forms of type are placed, the inking and distributing tables, the printing cylinders, with the necessary distributing and inking rollers, the ink troughs and ductor rollers, the carrying or conducting tapes or bands, and other parts which are necessary to the construction of a perfect machine: he therefore wishes it to be particularly understood, that he does not mean or intend to claim as his invention any of the parts which are old, or have been before in use, or which are common property in machines of this description; but he does claim as his invention the several novel features, additions to or improvements in such machines, as particularly set forth and described in his specification, as follows.

We shall now give the Patentee's specification in his own words; and he proceeds to state, that his improvements consist, first, in the manner or method of giving to the printing cylinders, by the hands of the workmen attending the machines, the necessary motions to cause them to travel backwards or forwards in the machines, so that they can be moved any distance required at pleasure, to print on different sized sheets of paper, or take impressions from different sized forms of type; that is to say, so that the cylinders may be made to move over a greater or less space at plea-

sure, without the necessity of any adjustment of the parts by which they are moved; the cylinders being moved by hand, independent of all the other parts of the machine, and the extent of their motion being variable through the whole space over or through which they travel, which is not the case when the motion of the locomotive cylinders depend upon the movements of any other parts, as in machines of this kind hitherto known.

Second, in the application to machines of this description of stationary or fixed delivering tables placed at different parts of the machines, as circumstances may require: upon which tables the sheets of paper intended to be printed are placed, and from whence they are delivered or given to the feeding apparatus of the machines by the persons attending the same, but which tables are also adjustable in their situations, as regards the printing cylinders, to suit their movements when printing on different sized sheets of paper, or from different sized forms of type, such delivering tables being moved nearer to or further from the printing cylinders, or otherwise adjusted, as the travelling motion of the cylinder is limited or extended when printing on smaller or larger sheets of paper.

Third, in the arrangement and construction of the apparatus, or those parts of the machine used for receiving the sheets of paper from the delivering tables, and giving them to the printing cylinders, and guide tapes or bands to be conducted through the machine and printed, and afterwards delivering the printed sheets from the machine, the guide tapes and printing cylinders forming no part of this improvement.

Fourth, the application to the locomotive printing cylinders of fingers or gripers, which take hold of the

sheets of paper as they are presented from the delivering tables, and cause them to be carried with the cylinders as they travel along the machines, and revolve over the forms of type. The fingers or gripers being mounted in the cylinders, and working in grooves or recesses in them, and, consequently, revolving with the printing cylinder, such gripers or fingers being intended to be used when the receiving apparatus last mentioned (under the third improvement) is not applied in the machines to take the sheets of paper from the delivering tables, and give them to the cylinders.

My fifth improvement applies to the improved construction of these kind of printing machines (that is, with locomotive printing cylinders), so as to be capable of producing an impression, or printing on both the sides of the sheet of paper, or what is called "perfecting," without the necessity of removing the sheets of paper from out of the machines during that operation; that is to say, these machines have each two locomotive printing cylinders and two forms of type, the sheets of paper being delivered to one of the printing cylinders from one of the delivering tables, and discharged from the other printing cylinder after taking an impression from both forms of type, and being printed on both of its sides; and this operation of "perfecting" the sheets takes place both in the forward and backward movements of the printing cylinders as they travel to and fro in the machines, they both being alternately supplied from the delivering tables with the sheets of paper to be printed, and consists in applying part of the before-mentioned improvements thereto, *and more particularly* in the improved mode, manner, or method of effecting the turning or reversing of the sheets of paper after being printed on one side by one printing cylinder, and

conducting and presenting the same sheet of paper to the other printing cylinder, to be printed on its other side; such improved perfecting machines having two stationary delivering tables, before mentioned in the second improvement, and two forms of type placed in the centre or middle part of the machines.

My sixth, and last improvement, also applies to these kinds of machines, having two locomotive printing cylinders and two forms of type, *and consists* in applying part of my before-mentioned improvements thereto, *and particularly* in the improved manner or method of printing in two different colours from two different forms of type on one side of the sheet of paper, without the necessity of removing the sheets of paper from out of the machine during this operation; which "*double printing*" on one side of the sheet takes place both in the backward and forward movements of the printing cylinders as they travel to and fro in the machine, the cylinders receiving their paper from two delivering tables. And I would here remark, previous to commencing the particular description of these my several improvements, that all these improved machines may be worked by hand, as mentioned under my first improvement, or they may be worked by a steam-engine, water-wheel, or other power, or from any first mover, by the application thereto of any suitable mechanical means or contrivances which will produce the proper motions of the printing cylinders: for instance, the motion of the printing cylinders may be obtained by cranks and connecting rods, endless bands or chains, or racks and pinions worked from a winch-handle, or rigger, or pulley, placed on a rotatory shaft mounted in proper bearings; it being a peculiar feature in these improved machines, that all the working parts depend upon the printing cylinders or

the framework in which they are placed for their movements, but which mechanical contrivances or agents are not new, as applied to printing machines with locomotive cylinders as heretofore known and constructed, and, consequently, the mere application of them to my improved machines forms no parts of my present improvements. But I would here remark, that such cranks and connecting rods, or other mechanical contrivances, used to give the proper movements to the printing cylinders of my improved machines, must be capable of adjustment, so as to give different extents of motion to the printing cylinders when required to print on different sized sheets of paper, or from different sized forms of type; which variable extent of motion of the printing cylinders is a novel feature in my improved machines. And as there are so many various ways of effecting this object by mechanical means, it is not necessary for me to describe them; I have, therefore, not shown in the accompanying drawings any of such contrivances, but which any competent mechanic will be capable of applying.

The several figures of Plate VII. exhibit several views of one of these kind or description of printing machines, with the first, second, and third of my improvements adapted thereto; in which machine there is but one printing cylinder and one form of type. Fig. 1, is a plan view of the machine, with the printing cylinder in the position it is in when passing over the form of type to produce an impression; one of the delivering tables being removed to expose the ink trough, ductor roller, and distributing table. Fig. 2, is an end elevation. Fig. 3, is another side elevation of the machine, with the cylinder in the position it is when it has travelled to one end of the machine, and is ready to

receive a sheet of paper from one of the stationary delivering tables, and when the distributing roller is in the act of receiving its supply of ink. The same letters of reference being marked upon corresponding parts in these and also all the following figures: those parts of the machine which are old, and do not form part of my present improvements, being marked with capital letters, and those parts which belong to my present improvements with small italic letters: A, A, is the framework of the machine, upon the upper part of which the printing cylinder B, travels, it being guided in its motions by a V-shaped bed on the top of one of the side frames, and a corresponding groove formed round one end of the cylinder. Upon the ends of the cylinder toothed wheels or rims C, C, are placed, which take into toothed racks D, D, on the top part of the framework: E, E, are the several inking rollers, to give the proper supply of ink to the form of type; and F, F, the distributing rollers, all of which rollers are placed in the travelling frame G, G, suspended from the axle of the printing cylinder B; which frame causes these rollers to travel and revolve over the distributing beds and forms of type as the printing cylinder moves forwards and backwards. This frame G, is kept in its proper position, and guided by small rollers running against the underside of the rack D: H, is the table upon which the form of type is placed, and which is adjustable, as regards the printing cylinders, by screws, in any convenient manner: I, I, are the two distributing inking tables, which, in this instance, are circular, and mounted on vertical shafts K, K, turning in proper bearings in the machine; and are made to turn a small part of a revolution every time the printing cylinder travels from one end of the machine to the other, by a part of the

frame G, striking against the levers L, L, mounted on the ends of the horizontal shafts M, M; which shafts turn in bearings at the ends of the framework, and carry clicks or palls, which act upon ratchet wheels, placed on the shafts K, K; whereby those shafts, and consequently the inking tables, are made to turn partly round after an impression has been given: N, N, are the ink troughs and ductor rollers placed at each end of the machine; and, in this instance, are mounted upon the supports of the delivering tables, and are consequently adjustable with them to suit the extent of motion of the printing cylinders; but if mounted independent of the tables, they must be adjusted in their situations as required by the cylinders or distributing rollers: O, O, are the guide tapes which conduct the sheets of paper to the cylinder and under it to be printed, and deliver it from the machine afterwards: which tapes or bands pass over the receiving rollers, hereinafter mentioned, and round under the printing cylinder; and these ends are passed over rollers or cross-rods at the ends of the machine, and weighted, to keep them in proper tension: *a, a,* are the two stationary delivering tables forming the first of these improvements, which are placed at each end of the machine, and supported on the arms *b, b,* extending from the adjustable pieces *e, e,* which slide in dove-tailed grooves *f, f,* in the side frames A, A, so as to allow of the tables being brought nearer to or further from each other, as the extent of travelling motion of the printing cylinders is increased or diminished, and may be fixed in their proper situation by tightening screws; or the delivering tables may be made adjustable in any other convenient manner. The sheets of paper to be printed are deposited upon the delivering tables *a, a,* and are placed by the person

attending the machine, with one of their edges projecting over the edge of the table, and upon the conducting tapes or bands o, o: *g*, is the winch-handle by which the rotary motion is given to the printing cylinder, and by which it is caused to travel along the machine; the toothed rims or wheels taking into the racks D, on the side frames, or the cylinder may be moved backwards and forwards without this winch-handle, by handles projecting from the frames G, G, by which the person attending the machine can push or pull the frame, and with it the cylinder, forwards and backwards, the racks and wheels giving it the required rotatory motion: *h*, *i*, are the receiving rollers, or those parts which first take the sheets of paper and give them to the cylinder, and forming my second improvement. These receiving rollers are mounted on the upper ends of the rods *k*, *l*, which rods slide in guides placed on the side of the frames G, G, and are acted upon by inclined planes *m*, and *n*, mounted on the sliding pieces *e*, *e*: which inclined planes alternately act upon the anti-friction rollers on the ends of the rods *k*, *l*, as the cylinder arrives at the ends of the machine; the lower ends of the rods *k*, and *l*, coming into contact with the inclined planes *m*, and *n*, as they travel along from one end to the other.

The action of this machine is as follows:—The person attending the machine turns the winch-handle round in the direction of the *arrow*, until the printing cylinder has arrived very near one of the delivering tables, as shown in fig. 6; the receiving roller *h*, will then be in the position shown in that figure, that is, with the tapes or bands o, o, raised up by it: the lower end of the rod *k*, being in contact with the inclined plane *m*, the edge of the sheet of paper at this time is projecting over the edge of the table *a*, and over the

centre roller P. On the cylinder continuing to move a short distance further in this direction, the anti-friction roller on the end of the rod *k*, will have passed over the end *o*, of the inclined plane *m*, where it consequently falls down, bringing the receiving roller *h*, with it, which falls upon the edge of the sheet of paper, and holds it in contact with the roller B, and its endless band: the winch-handle is then turned the reverse way (in the direction of the other arrow), by which the cylinder is made to revolve back again, carrying with it the sheet of paper, and passing over the form of type on the table H, where it receives an impression, which is produced by the weight of the frame G, G, and the cylinder as it rolls over the form of type. The friction roller on the end of the rod *k*, having passed under the inclined plane *m*, which gives way to it by turning on the pin by which it is suspended; and as the cylinder continues to revolve towards the delivering table at the left hand end of the machine, the sheet of paper is carried or conducted out from the cylinder between the roller *i*, and P, whence it is taken away by hand; at the same time the lower end of the rod *l*, meets with the inclined plane *n*, by which it is raised upward, and with it the roller *i*, ready to receive another sheet of paper between that roller and the centre roller P. At this time the other distributing roller F, comes in contact with the other ductor roller N, and receives the proper supply of ink to give to the distributing bed or table I. On the anti-friction roller at the end of the rod *i*, falling from the inclined plane *n*, the roller *i*, takes fast hold of the next sheet of paper from the other or left hand delivering table, when the winch-handle *g*, is again turned in the reverse way, and the sheet of paper carried through the machine; and after being printed, is delivered, as before, out at the right

hand end of the machine, and so on; the cylinder producing an impression at each forward and backward motion of the machine.

If any extraordinary pressure of the cylinder should be required, the anti-friction rollers on the frames G, G, might be tightened upon the under-side of the racks D, D, by which they would be made to hold down the cylinder upon the type, and thereby produce more pressure than is caused by its weight.

Fig. 4, is a sectional diagram of a variation of this kind of machine for printing from one cylinder, as it revolves both ways in the machine; B, is the printing cylinder, mounted as before described; H, H, the table holding the forms of type; O, O, the conducting tapes and bands; P, P, the guide rollers, with their endless tapes or bands passing round the cylinder; *h*, *i*, are the receiving and delivering rollers, over which the guide tapes *o*, *o*, are passed round the cylinder: the rollers *h*, *i*, are mounted upon the ends of the bent or bell-crank levers *k*, *l*, working on pins or studs in the moveable frames G, G, on their fulcrums; the lower ends of these levers are acted upon by inclined planes *m*, *n*, mounted in pins on the side frames of the machine A, A: *a*, *a*, are the two delivering tables, which, in this instance, are placed in the middle of the machine, and are adjustable to suit the action of the cylinder, as before. After the cylinder has arrived at one end of the machine, and has delivered its printed sheet of paper, and has also progressed a short distance backwards, it is ready to receive a fresh sheet to be printed, and will take hold of the edge of the sheet in the following manner:—the edge of the sheet of paper projects over the edge of the delivering table, and will be taken hold of by the rollers *h*, and P, or *i*, and P, according to which way the cylinder is travelling

(say *h*, P); whence it will be conducted under the cylinder by the guide tapes or bands, and printed; and in order to let the sheet of paper out of the machine without interfering with the next sheet as it is coming into the machine, the inclined planes *m*, and *n*, at this time, will come into contact with the anti-friction rollers at the lower end of the bell-crank levers; and thus the levers *k*, or *l*, and rollers *h*, and *i*, will be turned down into the position shown in fig. 7, (according to which end of the machine the cylinder is at,) and the sheet of paper will be free to be taken out from the top of the guide tape o, or from the under tables *a*, *a*; the weights at the ends of the tapes *o*, *o*, keeping them in proper tension when the rollers *h*, or *i*, move downwards. The rollers *h*, or *i*, being brought up again into the position shown in fig. 4, by their lower ends being weighted sufficient to bring them up again into that position after the rollers *h*, or *i*, have been depressed by the inclined planes acting upon the friction roller in the lower ends. These movements taking place at each forward and backward movement of the machine.

Having now described the action of these machines, I will proceed to show how the first described machine may be made to work or produce impressions in only one way in which the cylinder revolves, or only in one direction in which it travels; this may be advantageous when only a few impressions are wanted to be taken off, and time is not an object. When this is the case, only one person need attend to feed the machine, and may work it as well, if desirable (this may also be done when it is working both ways). 1, 1, is a rod, supported from the cross shafts M, and carrying a screw 2, which is to be turned up into a female screw in the socket 3, placed on the cross bar 4, which is linked to

the other cross bars or shafts 5, 5, turning in bearings at their ends, and carrying the four supporting arms or cams 6, 6, upon which the table H, rests.

When the machine is required to print only at the time the cylinder is moving in one direction, one of the sets of the inking and distributing rollers must be taken out of the machine, that is the set nearest to the delivering table intended to be used; and as the sheets of paper pass through the machine to be printed, the supporting arms or cams 6, 6, will bring up the table into the position shown in fig. 3, and the impression will be given; but on the end of the frame G, coming against the opposite arm L, its movement in turning the circular distributing bed I, will also cause the rods 1, 4, and 5, to move also, which will turn down the arms or cams 6, 6, and let the type table fall, so that the printing cylinder may return back to the other end of the machine, without pressing upon the form of type.

A diagram of another of these machines, constructed to print only one way, is shown in fig. 5, and may be useful as a simple single-action machine, and be made at a comparative low cost: B, is the printing cylinder, with frame G, for the inking and distributing rollers E, E, and F: H, is the table with the form of type; O, O, the conducting tapes; *a*, the delivering table; *i*, the receiving roller mounted on the sliding rod *l*, which is worked by an inclined plane placed on the side frame of the machine, as already described. In this instance, the sheets of paper are presented from the delivering table hanging over the cylinder; and as soon as the cylinder is ready to print the sheet of paper, the receiving roller *i*, falls on to the edge of the paper, and holds it against the periphery of the cylinder; the sheet of paper, after being printed, is discharged or left on the upper surface

of the lower portion of the conducting bands or tapes immediately over the type, whence they can be removed by hand.

Fig. 6, is another diagram, showing another variation of this kind of machine, in which the paper is given to the cylinder without the application of the raising and falling receiving roller *i*, in the last described machine: B, is the locomotive printing cylinder; E, E, and F, the inking and distributing rollers; O, O, the conducting tapes or bands; H, the type table; P, the roller, with its endless band encircling the printing cylinder: *a*, is the delivering table from which the sheets of paper are presented to the cylinder, and are taken in by the rollers P, and Q, which latter supports the tapes or bands O; and as the cylinder revolves, the impression is taken from the type, and the sheet is left by the cylinder on the tapes O, O, (as in the last printing machine,) from whence it can be removed before the cylinder returns. In the two last described machines, at figs. 5, and 6, the tables do not require to be adjustable, but may be fixed in the proper position as regards the cylinder.

Having now described the application and construction of my first, second, and third improvements, I shall proceed to describe my fourth improvement, viz. the application of fingers or gripers to locomotive printing cylinders, one variation of which is shown partially, fig. 7, in which one of the side frames is removed to expose the parts: A, is the framework; B, the printing cylinder; C, C, the toothed wheels; D, D, the racks; E, E, and F, the inking and distributing rollers; G, their frame; H, the type table; N, N, the ductor rollers and inking troughs; O, O, the conducting tapes or bands passing over the two rollers R, R, and round the cylin-

der, as before. The sheets of paper to be printed are placed, as before, upon the tables *a*, *a*, and are presented to the cylinder with their edges projecting over the edge of the table: *q*, *q*, are the fingers or gripers which take hold of the edge of the paper projecting over the table. When the cylinder has arrived at the ends of the machine, as shown in fig. 7, and is ready to receive the sheet of paper, these fingers are placed upon a shaft *r*, *r*, mounted and turning in bearings placed in a groove or recess formed in the periphery of the cylinder (see the detached view of the cylinder at fig. 8). The end of the shaft *r*, projects through one of the wheels c, and carries the small-toothed segment *s*, on its end, which takes into another toothed segment *t*, mounted upon the axle of the printing cylinder, so as to be capable of turning loosely upon it at times, but at other times is connected to it so as to revolve with it by a spring catch *u*: *v*, is a weighted lever turning upon a pin or stud as its fulcrum, which stud is placed in the side frame c, which side frame is removed in these figures. The upper end of this weighted lever acts upon the tail-piece *w*, of the segment *t*, in the following manner:—When the cylinder has arrived into the position shown in fig. 7, that is, ready for receiving a sheet of paper, the lower end of the weighted lever *v*, will have come into contact with one of the fixed studs or stops *x*, *x*, placed in the side frames at each end of the machine, and will force the lever out of the perpendicular line, as shown in the figure, which will cause it to act upon the tail *w*, and turn the segment *t*, partly round in the direction of the arrow. This movement of the segment *t*, will also turn the segment *s*, and with it the shaft *r*, and, consequently, turn the fingers or gripers *q*, *q*, over into the position shown in fig. 12,

and in the enlarged detached end view of the cylinder, fig. 9, and cause them to take hold of the edge of the sheet of paper which is between them, and the edge of the grove or periphery of the cylinder; and by these means the paper will be carried round with the cylinder to the form of type to be printed; the end of the spring catch *u*, which is fixed on the wheel C, taking into one of the notches formed on the smaller radii of the segment *t*, *t*, and consequently retaining it in connexion with the cylinder and wheel, until the cylinder arrives near the middle of the machine, when from the segments revolving with the cylinder, and the weighted lever hanging independent of them on the frame G, the end of the tail-piece *w*, will have come into contact again with the end of the lever, but on its other side; the weighted lever will then cause the fingers or gripers to be turned up into the position shown in fig. 10, and release the edge of the paper from the hold of the fingers or gripers; and as the cylinder continues to revolve the tail *w*, will pass away from the end of the lever *v*, which will regain its perpendicular position; and also the fingers, which now project up from the cylinder, will be wiped or pressed down again into the groove by their passing under one of the rollers R, as shown in fig. 11. The continuous motion of the cylinder towards the right hand end of the machine, brings the weighted lever against the other fixed stud *x**: at this time the edge of the paper on the delivering table *a**, will lay over on to the cylinder; and on the cylinder completing its motion to this end of the machine, the upper end of the lever *v*, will act upon the tail-piece *w*, and turn the segments *t*, and *s*, over the reverse way to that at the other left hand end of the machine, and consequently throw the fingers over on to the edge of the

sheet of paper, and thereby holds it fast, the returning movement of the cylinder carrying the sheet of paper through the machine to be printed, when the same motions will take place as already described, the fingers or gripers, at every forward and backward motion of the cylinder, taking a sheet of paper, and giving it to the cylinder to be printed, the printed sheets being delivered out at the opposite roller R, to that by which they entered the machine.

A variation of the construction of these fingers or gripers, as applied to locomotive cylinders, is shown in figs. 12, and 13. Fig. 12, is a partial plan view of the printing cylinder, with the inking and distributing rollers, and their frame, drawn on a larger scale. Fig. 13, is an end elevation of the same, one of the side frames being removed, and showing the fingers or gripers up, and ready to take hold of a sheet of paper. In this arrangement and construction of the fingers or gripers they are worked by the action of the cylinder: B, is the printing cylinder; E, E, and F, the inking and distributing rollers; G, G, their frame; R, R, the rollers over which the tapes or bands O, O, pass and under the cylinder; *g*, is the winch-handle for giving motion to the cylinder; a, a, are the fingers or gripers, which, in this instance, are mounted upon the ends of the rods or arms b, b, placed upon the rod c, c, passing through the printing cylinder, and working in oblong slots in its ends, and also in the toothed wheels C, C. The ends of this rod project through the wheels, and carry small anti-friction rollers d, d, which work on a pair of peculiarly-formed guides or pieces e, e, which give a radial expanding motion to the rod c, and fingers a. These guide pieces are mounted, suspended from pins or studs in the side frames G, G, and hang down so as

to touch the axis of the printing cylinder, as shown in fig. 13, and the detached perspective view, 15. As the cylinder B, and the toothed wheel C, revolve, the oblong slots cause the rod c, and the anti-friction roller d, to revolve with them; and as the anti-friction roller runs in contact with the sides of the peculiarly-formed guide pieces e, e, they alternately work against the outside and inside of these guides in the backward and forward motion of the printing cylinder: f, f, are helical springs fastened to the inside of the cylinder, and to the rod c, and have a tendency to draw the fingers or gripers inwards, but give way to the action of the anti-friction rollers d, and the guide pieces e, e. The springs cause the fingers to take fast hold of the edge of the paper when the roller is released from the action of the guides.

In fig. 13, the cylinder is supposed to be revolving in the direction of the arrow, that is, advancing towards the table, and just ready to receive a sheet of paper which will be presented by the delivery table under the fingers a. At this time the friction roller will have arrived at the extent of its expanding motion, that is, after travelling on the outside of the guide c*, and has arrived on the top or end of it; and as the cylinder still revolves a short distance in this direction (to the extent of its motion), the roller immediately passes over from the top of the guide piece, and falls down between the two guides e*, and e**, and the fingers take fast hold of the sheet of paper. The cylinder is now made to revolve in the reverse direction: the anti-friction roller then forces the guide e*, outward from the axis of the printing cylinder, it giving way to it; and as the cylinder continues to revolve in the reverse direction, the anti-friction rollers come into contact with the guide

piece e*; and as its end lies close to the axis of the cylinder, the roller is caused to travel on the outside of the guide piece e*, and the fingers are, consequently, again expanded radially as the friction roller arrives at the end of the guide piece e** ; and when the cylinder has travelled to the end of the machine, and is ready to take another sheet of paper, the friction roller then falls down between the two guide pieces, and the cylinder immediately begins to revolve the reverse way to produce another impression on the fresh sheet of paper, and so on at each forward and backward motion of the cylinder, the anti-friction roller falling in between and travelling on the outside of one of the guide pieces at each motion of the cylinder through the machine. Fig. 15, is a cross section of the cylinder, showing one of the fingers down, holding a sheet.

My fifth improvement, viz. the constructing of these kind of printing machines capable of perfecting the sheet; and more particularly in the mode or method of turning or reversing the sheet of paper after being printed on one side by one cylinder, and giving it to the other cylinder to be printed on the other side, is shown in figs. 16, 17, and 18. Fig. 16, is a longitudinal section; fig. 17, is a plan view, one of the delivering tables being removed to expose the parts; fig. 18, a transverse section of the same: A, A, is the framework; B, B, the two printing cylinders; C, C, the toothed wheels; D, the rack; E, E, and F, the inking and distributing rollers; G, their frame; H, the type tables; I, the circular distributing tables; K, their shafts; N, the ductor rollers; O, the bands or tapes passing over the rollers R, R, and under the printing cylinders B, as before, and over the small lower roller S: *p*, *p*, are the middle rollers, mounted on weighted levers, with their endless bands,

which also pass round the cylinders: h, is a weighted lever, suspended from a pin i, as its fulcrum, placed in the frame G, upon the lower end of this lever h: the small reversing or transferring roller k, is mounted, which roller effects the changing of the sheet from one printing cylinder to the other in the following manner:—on the lower end of the lever h, is mounted the tappet-piece i, to which it is connected by a knuckle joint: this piece i, comes in contact with a projecting stud or pin m, placed in the centre part of the side frame A, A: a*, a**, are the delivering tables, supported in any convenient manner, and in this instance, are placed in the centre part of the machine, and upon which the sheets of paper are placed, and are made adjustable to the extent of motion of the cylinders, by raising or depressing them; that is, by increasing or diminishing the angle at which they stand to each other and the machine, the hinge joint at their top part allowing them to be adjusted freely, the ends of the sheets of paper projecting over the tables, and are presented to the cylinders, and enter between the one pair of rollers R, and P, and leave them by the opposite pair of rollers R, P, according to the way in which the cylinders are travelling, supposing the cylinders to be in the position shown in fig. 16, that is, ready to receive a sheet of paper, it will be delivered from the table a*, in between the pair of rollers R*, and P*, which will then be advancing towards that table; the cylinder B*, revolving in the direction of the arrow, the sheet of paper will be carried round with and under it, and receive its first impression from the form of type H*, and will leave the cylinder B*, guided by the tapes and endless bands between the rollers; and as the cylinders continue to revolve towards the right hand end of the machine, the

paper will be given out, and pass up between the two printing cylinders; and as soon as its latter end has left the roller, the knuckle piece comes in contact with the stationary stud or pin; and the cylinders continuing in their motion, the stud will change the position of the lever to the other side, the roller carrying the latter end of the sheet of paper into contact with the endless bands of the cylinder; and this cylinder revolving in the direction of its arrow, will carry the sheet of paper round it, and onward to the second form of type H**, where it will receive another impression, and be printed on the other side; and when this is effected, the continuous motion of the cylinders causes the pair of rollers R**, P**, to take another sheet of paper from the table a**, when the reverse movements of the cylinders will produce the same effects as the next sheet of paper passes under the cylinders and through the machine, which will be repeated at each forward and backward movement of the cylinders. The printing cylinder B*, B**, must not interfere with each other's form of type, the forms being placed in a horizontal line with each other; therefore, the cylinders run or travel upon two distinct Λ beds, and on two different parts of the top of the side frames A. The cylinder B*, when passing over the form of type H**, runs up on the highest part of the Λ bed or top part r, of the side frame, and when printing has descended the inclined plane s, and runs upon the lower part t, (shown by dots,) and the cylinder B**, runs upon the part u, when passing over the form of type H*, and descends the inclined plane v, and runs upon the lower part w, (shown by dots) when printing from its form of type H**.

My sixth improvement, namely, the improved method of printing in two different colours from two different

forms of type on one side of the sheet of paper from a double locomotive cylinder machine, without removing the sheet of paper from out of the machine during that operation, is shown in figs. 33, and 34, of the accompanying drawings: B*, B**, are the two printing cylinders; H*, H**, the forms of type supplied with two different colours from the two ductor rollers and colour trough at the ends of the machine; O, O, the conducting tapes or bands passed over the roller R, R, and round the cylinders: P, P, are the inner rollers mounted on the ends of levers, weighted to keep their endless bands in proper tension; these endless bands are passed over and under the rollers *z*, *z*, *z*, for the purpose of gaining sufficient length of tapes for the sheet of paper to travel over, when passing from one form of type to the other. The sheets of paper are delivered from the tables *a*, *a*, placed in the middle of the machine, as before described, and are taken into the machine between the rollers R, P, R, P, according to which way the cylinders are travelling through the machine, the sheet of paper passing under the cylinder B*, receives its impression from the form of type at H*, and then travels upwards and downwards, over and under the rollers *z*, *z*, *z*, on to and under the cylinder B**, and passing under that cylinder, receives its impression from the form of type H**; and this is effected during one motion of the cylinders along the machine, the paper being delivered out of it by the opposite pair of rollers R, P, to which it entered; and after it is taken away, a fresh sheet is fed into the same pair of rollers R, P, by which the last printed sheet left the machine, which fresh sheet then passes through the machine as the cylinders revolve back again receiving its impression from both of the forms of type, and so on, each motion of the machine giving the two

impressions on one side of the paper, and completing the printing, it, of course, being understood that the two sets of inking rollers which supply the forms of type with different colours do not interfere with each other's form of type, they being made to run upon different parts of the top of the side framework; one part being higher than the other, so as to cause them to clear the type to which they do not belong, as also is the case with the cylinders in the manner last described. —[*Inrolled in the Rolls Chapel Office, September*, 1835.]

Specification drawn by Messrs. Newton and Berry.

To GEORGE BEADON, *of Taunton, in the county of Somerset, lieutenant in the Royal Navy, for his invention of a machine or apparatus for preventing boats, or other floating bodies, from capsising or overturning when oppressed by too much sail, and for easing off the ropes and sheets of different classes and descriptions of vessels, parts of which machine or apparatus may be applied to other purposes.*—[Sealed 10th July, 1834.]

THIS invention consists in an apparatus attached to the sheet-tacks or other ropes appended to the sails of vessels, and so constructed that when ships, or other floating bodies propelled by the action of wind or sails, are careened or heeled down sufficiently to one side, or, in other words, when their inclination to one side is sufficiently increased, the sheets, tacks, or other ropes ease themselves off, or rather are let go, without the attention or assistance of any of the crew.

In Plate VIII., fig. 1, A, is a box or casing containing

a reel B; (see fig. 2;) round this reel is coiled the rope, tack, or sheet C, as the case may be, attached to the sail of the vessel; D, a bracket fixed to the reel box, for the purpose of fastening it to some convenient part in the vessel; E, the axis or spindle of the said reel passing through the sides of the reel box which form its bearings; F, is a catch or pall working into the teeth of the wheel G, this wheel being fixed to the spindle of the reel; H, a lever attached to the above catch or pall, both moving on the spindle; R, L, a balance weight attached to the end of the said lever; M, a spring pressed against the spindle of the reel by means of a set screw N: this spring is formed into the shape of a hook towards the end, and bent round the pin O, which is fixed to the pall or catch; P, a pin or stop, to prevent the balance or weight from moving too far: in this figure part of the rack wheel G, is broken away, to show the spindle hole; and it will be seen that the hole in the front plate of the reel box, through which the spindle of the reel passes, is made oval, in order to allow any force pulling the rope C, to cause a pressure of the spindle on the spring M, thereby disengaging the pall when the balance weight is, by the heeling of the vessel, brought over its fulcrum: thus it will be seen that it must be the combined circumstances of a given strain on the rope, and a given heel or inclination of the vessel, to cause the pall to escape from the rack wheel and let off the rope: if this were not so arranged, every accidental roll or lurch of the ship, even in a calm, might ease off the sheet.

Fig. 2, represents a side view of the apparatus; and it may be as well here to state, that similar letters denote similar parts in all the figures: in this figure the reel-

box is supposed partly open, to show the reel with the rope or sheet coiled round it: O, is a square part of the spindle of the reel, to which a handle is applied when the sail is to be set, and the sheet sheeted home on the rope, whenever it may be hauled taught. In fig. 3, the disengaging of the pall is caused by the weight L, rolling down the inclined plane Q, when the vessel heels sufficiently to bring the plane below the horizontal line. In fig. 4, the pall is disengaged by a float R, acting on the weighted lever S, when the vessel heels sufficiently to make the fluid contained in the box U, assume the level marked by the dotted line *a*, *b*.

Now, whereas it often happens that vessels sail better, some when dipping down towards the stern, and others when dipping towards the stem, and some when floating exactly, evenly, or horizontally on the water; and in order to ascertain whether the vessel has attained that line of floatation which has been ascertained to suit her sailing best, I take that part of the apparatus, fig. 4, which consists of a box U, and a float R, and place it on the centre of the deck, observing the inclination of the float R, which will take exactly the opposite inclination to that of the vessel; and if the sides of the box U, be graduated, will enable the stevedore to trim the vessel as he loads her cargo, or the captain to put her in the fastest sailing trim.—[*Inrolled in the Rolls Chapel Office, December*, 1834.]

To THOMAS HORNE, *of Aston, near Birmingham, in the county of Warwick, brass-founder, for his invention of certain improvements in the manufacture of hinges.*—[Sealed 24th July, 1835.]

THESE improvements in the manufacture of hinges, consist in making hinges from sheet metal so shaped or formed of unequal thickness, either by rolling, stamping, drawing, or swaging, as to enable me, by applying the thinner part of the metal to form the joint or knuckle, to produce hinges with a smaller and neater joint than could be obtained if made out of sheet metal of an uniform thickness throughout, and thereby economizing labour and material.

In pursuing this improvement in the manufacture of hinges, strips of sheet metal, previously rolled, are to be provided of suitable width and thickness, and of any convenient length; which strips of metal are then to be reduced by passing them between rollers, or by stamping, pressing, drawing, or swaging, so as to form the strips of metal thinner in one part than another, as, for instance, in the manner shown in section, at figs. 5, 6, and 7, Plate VIII. From these strips the required lengths are to be cut, each for making one hinge; and as I prefer the shape shown at fig. 5, from affording the greatest economy of material in cutting up the strips, I shall proceed to describe the means of carrying my improvements into effect in reference to the form shown in that figure.

Fig. 5, is a transverse section of this strip of metal; fig. 8, representing the face of a portion of the strip broken off, the groove *a*, being formed along the middle,

and constituting the thinner part. The necessary piece for making one hinge is shown as at fig. 9, (subject, however, to variation for different sizes;) and these pieces are then, by a stamping process, to be cut or separated into the two portions shown in face and edge views at fig. 10; the parts *a, a, a*, to form the knuckle, the parts *b, b*, to constitute the wings of the hinge. If thought requisite, these pieces of metal may now be annealed, in order that they may be bent in forming the knuckle without the risk of breaking.

The thin parts *a, a, a*, of the pieces shown at fig. 10, are now to be bent round or hooked, as represented at fig. 11, in edge view, and fig. 12, in front view, in order to prepare them for forming the knuckle. This may be done by pressure in a swage or tool, or in any convenient manner; and when the piece has been so bent, a straight and cylindrical wire is to be placed within the hooks as a mandrel, and these together are to be introduced between a pair of dies, as fig. 13, for the purpose of forcing the hooked parts into a cylindrical form, which form may be perfected, and the edges of the hook made to fall into the rabbet, or close against the shoulder *c*, by being further pressed between other dies, as shown at fig. 14, which brings them into true cylindrical eyes or knuckle joints. The screw holes are now to be made and countersunk, or they may be made before the knuckle joints are formed, if preferred. The mandrel being then drawn out of the cylindrical eyes, the knuckles of the two corresponding pieces are to be "cut down," that is, trimmed and squared, so that their edges may fit accurately together, which may be done by a file, or by a revolving cutting tool.

The pieces may now be cleaned, and the pin or straight cylindrical wire or axle inserted into the joint

of the combined pieces, when the hinge should be squared on its outer edges, and finished, as shown in face and edge views at fig. 15.

I may add, that the turned-in edges of the hooks may be soldered to the shoulder *c*, if thought desirable, for the purpose of giving additional strength to the joint; but for hinges of small dimensions, I have never found that necessary. I may also observe, that the eyes or knuckle joints may be formed by a drawing process, the thin parts *a*, of the strips being closed upon a mandrel, by drawing them through dies; but the subject of my invention being that of producing hinges from metal of unequal thicknesses, in order that the joints may be formed from the thinner parts of the metal, I do not consider it necessary to describe every possible mode of effecting the same; and particularly, as that drawing process is not attended with the same economy as the mode described.

And I would further remark, that in manufacturing hinges of iron, that the iron may be heated, for the purpose of facilitating the bending of the hooked parts, which may be desirable when making large or heavy hinges; and that in adapting these improvements to making iron hinges with long straps or arms projecting from one or both of the flaps or wings, as shown in figs. 16, and 17, I should proceed in the manner above described, in manufacturing the hinge parts *e*, *e*, and after they are so far completed as to be put together, the tail-pieces or straps *f*, *f*, should be welded thereto.

In conclusion, I desire it to be understood, that I am aware brass hinges have been made from pieces of sheet metal of parallel or uniform thicknesses throughout, the two parts of the hinge having been stamped out of metal, and the eyes or knuckle joints formed by bending

the metal round a mandrel; but the hinge so produced, differs essentially from my improved hinge: I do therefore claim, as my invention of improvements in manufacturing hinges, the exclusive privilege of making hinges out of sheet metal, peculiarly prepared, of unequal thicknesses, by means of rolling, drawing, stamping, or swaging, so that the parts which are used to form the knuckles or joints, shall be thinner than the parts used to form the flaps or wings of the hinges; and of turning over the said thinner parts of the metal into a rabbet, or against a shoulder, in the manner I have before described.—[*Inrolled in the Rolls Chapel Office, January,* 1836.]

Specification drawn by Messrs. Newton and Berry.

To GEORGE LAWRENCE, *of New Bond-street, in the parish of St. George, Hanover-square, in the county of Middlesex, dressing-case maker, for a certain improvement in the screws used in fastening the mouths of mounted ink-stands, perfume, liqueur, and medicine bottles; also in fastening the mouths of jars and tumblers, used in paste, salve, powders, preserves, and other purposes.*—[Sealed 8th March, 1836.]

THE object of this improvement in the screws used for fastening the mouths of bottles, jars, and other vessels, is the more easily and readily securing or fastening the tops or covers over the mouths of such bottles or jars, in order to perfectly close the same, and secure the contents thereof; and consists in placing the screws which tighten the top or cover on to the mouth or aperture of the jar or bottle, together with the said top or cover, in a separate frame, attached to the mounting of the bottle

or jar by a hinge and a simple catch fastening, or otherwise. The screw frame and top or cover being brought over the aperture or mouth of the bottle or jar, and held by the catch; when by turning the male screw round a part of a revolution only, it tightens the top or cover on to and over the mouth of the bottle or jar, and effectually closes and fastens it; and, at the same time, so secures the catch fastening, that it cannot be undone, or the top or cover of the bottle or jar released, until the male screw is turned the reverse way, as in the act of opening the bottle or jar, for the moment the pressure of the screw is taken off the mouth of the bottle, the catch is free to be undone. I would remark, that I am aware that screws have been heretofore used for fastening the tops or covers over the mouths of bottles and jars, and to all purposes to which my improved fastenings are applicable; but such screws have heretofore been made on the neck of the bottle itself, or the mounting thereof, and within the cap or cover; in which construction they are obliged to be completely unscrewed, and removed from the bottle, whereby the top is liable to be lost or let fall, which injures the edge of the cap, and consequently its screw, and causes a difficulty in first getting the screws to bite, or enter each other in putting on the cover or top; and further, small male screws have been attached to the top or cover, and screwed into a hole in the mounting of the bottle or jar, which also requires to be completely unscrewed in opening the bottle; and also such screws have been placed in a separate bar extending across or over the top or cover, being detached from it; the point of the male screw pressing upon the cover of the bottle or jar to keep it tight, and requires several turns to fasten and unfasten it: in all of which constructions, much longer

time is taken up in fastening or unfastening the mouth of the bottle or jar, than in my improved construction; for my improved fastenings unite the advantages of the powerful pressure of the screw with the quickness of the catch-fastening: my improved screws, from being of large dimensions, require to be turned only a part of a revolution either way, to fasten or unfasten the cover of the bottle; and the male and female screws are never parted or completely unscrewed from each other, but are at all times in connexion.

Having stated the nature and object of my invention, I shall proceed more particularly to describe the construction thereof, referring to the several figures of the accompanying drawings, which will sufficiently illustrate my invention. The same letters being marked upon corresponding parts in all the figures.

Fig. 18, Plate VIII., is a section of an ink-bottle, with my improvements adapted thereto; the top or cover being closed upon the mouth, and securely fastened. Fig. 19, is a side view, the top being unfastened, and the mouth of the bottle open. Fig. 20, is a plan view of fig. 19. Fig. 21, is a plan of the screw frame detached. Fig. 22, is a side representation thereof; and fig. 23, is a similar view of the top or cover: *a*, is the bottle; *b*, the mounting of the same; *c*, is the screw frame, which in this instance is attached by the hinge *d*, to the mounting. The female screw is formed around the inside of the frame *b*, and the male screw *e*, on the outside of the top or cover *f*. The catch *g*, is attached to the mounting by a pin and hinge joint; and when the cover is put down, as in the act of closing or fastening the mouth of the bottle or jar, the catch is to be passed over and between the projecting ear or pieces *h*, *h*, on the screw frame; and the moment

the pressure of the screw acts on the mouth of the bottle, the curved or inclined shape of the ears *h*, *h*, cause the catch *g*, to turn inwards a little and securely fasten it, and prevent it being removed or undone until the pressure of the screw is taken off from the mouth of the bottle, at which time the catch *h*, is free to be turned back, and the cover removed from off the mouth or aperture of the bottle or jar.

Having now particularly described the object and construction of my improvements, I would remark, that as the male screw does not require at any time to be removed from out of the female screw, there should be a small pin or stud placed in the frame *h*, or male screw *c*, to prevent its being turned round more than necessary. If thought desirable, the male screw may be formed on the outside of the screw frame, and the female screw within the top or cover, the ears or pieces *h*, *h*, and the hinge, being placed so that they will not interfere with the top or cover, as shown in the partial side view and section figs. 24, and 25. And further, that the screw frame need not be connected to the mounting of the bottle or jar by a hinge, but held thereon and connected thereto by simple hook or catch fastenings fixed on the mounting, and projecting over ears or pieces on the screw frame, when the cover is placed on the bottle, as shown in the plan and partial side view, fig. 26; which arrangement may be advantageous for large-mouthed jars or bottles: and also, that the catches may be made with springs, which will yield to the screw frame as the cover is pressed down, and hold it securely on, when the pressure of the screws fasten the top or cover on the mouth of the bottle, jar, or other vessel, the spring catch being undone by pressing the thumb on a button, as in common. And, in conclusion, I wish

it to be understood that I claim as my invention the improved construction of the screw fastenings as above described, (that is to say) in placing the screws which tighten and securely fasten the tops or covers on to or over the mouths of bottles, jars, or other vessels, together with the tops or cover thereof, in a separate frame, as hereinbefore set forth, such frame being attached or connected to the mounting of the bottle or jar by hinges and catch fastenings, or catch fastenings alone, such fastenings being secured, and prevented from being undone, by the pressure of the said screws upon the mouth of the bottle."—[*Inrolled in the Rolls Chapel Office, May*, 1836.]

Specification drawn by Messrs. Newton and Berry.

To DANIEL DEWHURST, *of Preston, in the county of Lancaster, flax-spinner, and* THOMAS HOPE, JOSEPH HOPE, *and* ISAAC HOPE, *all of Manchester, in the county of Lancaster, mechanics, for their invention of certain new and improved machinery for preparing flax and hemp; also certain new and improved machinery for spinning flax, hemp, cotton, silk, and other fibrous substances by power.*—[Sealed 16th December, 1835.]

THESE improvements, in preparing flax and hemp, and spinning or twisting flax, hemp, cotton, and other fibrous substances, consist, in the first place, in subjecting the flax and hemp to a process of steeping, washing, boiling, and pressing, or squeezing by means of rollers or machinery, previous to its being heckled, by which the appearance of the staple is much improved, and its strength less injured, than in the common method ot

preparing; and at the same time a great saving effected, there being less tow or waste made in the after processes of heckling, dressing, &c.; and secondly, in new or improved constructions, combinations, or arrangements of the parts constituting the mechanism, by which flax, hemp, cotton, silk, and other fibrous substances are spun into yarn or twist with considerable advantage, and a material increase of the speed may be effected, and a greater quantity of yarn or twist produced in a given time, than is commonly obtained. These advantages, combined with the extreme lightness of the improved spindle and flyer, they being only about one-fourth the weight of ordinary spindles, enable us to spin yarns of nearly any degree of fineness that the fibre will admit. The peculiar parts of which improved mechanism or spindle and flyer is composed, will be clearly understood by reference to the accompanying drawing, in which the same letters of reference indicate the corresponding parts in all the figures.

Our process of improvements in preparing and refining flax or hemp, is effected by first taking it in its raw state, and steeping it in diluted acids of almost any description; but that which we prefer, is vitriolic acid diluted or reduced with water so as to be just bearable by the palate; but the strength of the solution must depend materially upon the strength, or coarseness or fineness of the fibre to be acted upon. The common Irish flax will require a much stronger solution than Flemish flax; therefore the judgment of the operator must be used and proved by experience. When the flax has been steeped in the diluted acid a sufficient time to have become completely saturated, it will be found that the resinous or gummy matter, and also the outer bark or shell will be loosened from the fibres:

the flax or hemp in this state is then to be passed between a pair of pressing or squeezing rollers, which may be adjustable by screws, weighted levers, or otherwise, for the purpose of giving any degree of pressure; by which means the solution of acid, with the loosened resinous or gummy matters, will be expressed, and the bark or boom, or woody material crushed, which will allow the extraneous matter to run off. The flax or hemp must now be well washed in clear water, so that the remaining part of the acid may be completely removed, and then subjected to the action of heat, by being boiled a few hours in a strong solution of soap ashes and soda, or any other alkali, for the purpose of effectually separating the fibres of the material, and giving it a bleached and more glossy appearance. The hemp or flax is now again to be passed through the pressing or squeezing rollers, as above described, for the purpose of expressing the extraneous remains; and the boiling and squeezing processes must be repeated three or four times, according to the nature of the flax or hemp, when the fibres will have become completely separated, though, perhaps, somewhat entangled and matted together; and in order to straighten them, and lay them side by side, that they may not be broken by the heckle, the flax is well rinsed in strong soap leys, and hung in stricks to drain. After this washing and squeezing, or pressing, has been repeated a sufficient number of times, the flax or hemp may be slightly beaten, and then passed once or twice over an ordinary heckle or stiff brush, when the now cleaned fibres will be sufficiently heckled, combed, brushed, or laid straight, so as to be fit for the drawing and roving frames.

The second part of our improvements, viz. in the machinery for spinning flax, hemp, cotton, silk, and

other fibrous substances, are shown in Plate VIII., at figs. 28, 29, 30, 31, and 32. Fig. 28, is a partial sectional elevation of the arrangement, construction, or combination of the spindle, bobbin, and flyer, we prefer to be used for spinning all kinds of flax or hemp, and the finer numbers of cottons, silks, &c. Fig. 29, is another similar representation, showing the combination or arrangements particularly adapted for spinning coarser and heavier yarns; and fig. 30, shows the particular plan, arrangement, or construction we propose to use to spin all kinds of yarn which constitute the quality of weft, and require to be spun or wound upon what is called a "pin cop bobbin," that is, a bobbin peculiarly constructed for the shuttle of the weaver, without requiring the loss of time occasioned by winding the thread from the ordinary bobbin: *a, a, a*, is the stationary or fixed spindle of the ordinary throstle frame, which is surrounded by the tube *b, b*, and connected to the warve or pulley *c*, by which the flyer *d*, is driven; in our improved arrangement we prefer so doing to the ordinary custom of driving the spindle and bobbin; the flyer *d*, is furnished with guides or conductors *e, e*, which conduct or lead the thread or yarn immediately to the bobbin without endangering its breaking, as frequently occurs when it comes in contact with the head of the bobbin as the yarn proceeds from the drawing rollers in the ordinary manner: this flyer is also provided with a small central shaft or upright bearing, which supports the flyer, and runs in the small cup or recess *g*, at the top of the stationary spindle *d*, and is fixed with the flyer to the tube *b, b*, which is altogether carried round or driven by the warve *c*.

It will be seen clearly by reference to the detached fig. 31, that the warve *c*, and tube *b*, are connected at

bottom by a half-lap coupling joint or clutch; this is for the purpose of allowing the tube *b*, to be slidden up the spindle, and more readily removing the bobbin when it is full of yarn, and without the necessity of stopping the frame or removing the band from the warve *c*, the tube of which runs in the step or cup *h*, fixed upon the boulster rail near the bottom of the throstle frame. The traversing of the bobbin or the copping motion is effected exactly in the same manner as in ordinary throstles, that is, by the lifting and lowering of the copping rail *i*, which, in this instance, supports the bobbin. In fig. 29, the flyer is constructed of twice the length of the bobbin, to allow the same to rise and fall freely within it, and is connected at top by a slight crosspiece, for the purpose of preventing the arms of the flyer from expanding by the centrifugal force when running at a high velocity; and it will be seen in the drawing that the flyer, and all others for spinning coarse numbers, require to have an inner tube *k*, *k*, for the purpose of affording greater support to the spindle. The bobbins in this figure and in fig. 30, are supported upon a collar or washer *l*, *l*, attached to the spindle near the top; and the spindle, in these two cases, is not fixed or perfectly stationary, but allowed to revolve in a slight degree at times by the friction of the drag weight *m*, *m*, connected to the bottom of the spindle, and placed upon a leather or cloth washer, and rubbing against the copping rail *i*, when dragged by the thread at those particular times when the drag is required, which drag is thereby regulated and adjusted, and made to accommodate itself to the tension or resistance required; and in case of any unusual pull or drag upon the thread, it will not break, as heretofore, but be allowed to pass freely by the slipping round of

the spindle and weight, as above described. The weight *m*, has a hole formed in it with a flat side, as seen in the detached fig. 32; and the end of the spindle is of a corresponding shape, which allows it to be withdrawn and replaced at pleasure, and prevents the necessity of fixing them together by pins, screws, or otherwise.

It will be obvious that many minute parts have unavoidably been alluded to and described for the sake of rendering our invention more evident, and which, except in connexion with the parts and particular arrangements and combinations, are not intended to be claimed; but all such particular arrangements, connexions, and combinations, as we have above described and shown for effecting the object proposed, we consider ourselves justly entitled to by virtue of our Letters Patent.—[*Inrolled in the Rolls Chapel Office, February,* 1836.]

Specification drawn by Messrs. Newton and Berry.

To ALPHONSE HUMBERT JEAN FRANCOIS VALOIS, *of Lyons, in the kingdom of France, lately residing at Artillery-place, Finsbury-square, in the parish of St. Luke, Old-street, and county of Middlesex, gentleman, for his invention of a certain improvement or certain improvements in the mode or method of producing engravings, etchings, or reliefs on metallic plates for producing impressions therefrom, and in the apparatus used in the same.*—[Sealed 13th May, 1835.]

THIS invention is a mode of producing raised devices upon the surfaces of blocks or plates of metal for printing calico, silk, and various other fabrics, and paper hanging, in one or more colours; and consists, first, in

forming such metal plates or blocks by casting them from an original, or model, carving, engraving, or etching, produced in plaster, fine clays, or other suitable composition or substance, which is susceptible of being easily cut, scraped, carved, engraved, or etched with any proper tool or instrument, and which will not require the delicacy, skill, nicety of workmanship, care, or time required to produce an engraved, carved, or etched original metallic plate, or wood block, or die, or matrix, by engraving, carving, or etching by hand on metal or wood as in common, such metallic blocks or plates being produced by casting or pouring fluid metal of suitable qualities on to the said model, plaster, or composition, engraved, etched, or carved; which metal castings are afterwards dressed and finished ready to be used for producing imprints or impressions on the various fabrics, after the manner of calico block or plate printing, or other printing or paper staining. And, secondly, in the producing duplicates in metal of plates or blocks which have been produced by the above method, or by the ordinary process of forming such blocks or plates. And, thirdly, in the instruments or apparatus used in producing the figure, designs, or patterns on the original plaster or composition model, from which the metallic plates or blocks are to be produced.

In producing metal plates or blocks with raised figures or patterns thereon, by casting them from an original plaster mould or matrix, without the help of an engraved original metal matrix or plate, I pursue the following mode or method:—I first take a frame of metal, or other material, of suitable shape and dimensions, which frame I place upon a perfectly smooth and even surface, such as a polished piece of plate

glass, or on polished metal: into this frame I pour very fine and properly prepared plaster, clay, or such similar composition, which is allowed to set, and after being slowly and nearly dried, the plaster or clay, which was next or in contact with the plate glass or metal, will be found to have a smooth and even surface, on which is to be drawn, traced, sketched, transferred, or printed, the drawings or patterns intended to be produced in raised figures on the metal blocks or plates.

The producing of the original mould or matrix, is done by cutting, scraping, carving, engraving, or drilling into the plaster surface with any suitable instrument or apparatus, on or over all the lines or tracings of the design or pattern; such cutting, carving, or drilling into the plaster being executed to a proper and equal depth over the whole design or pattern, thereby forming an excavated, or engraved, or sunken plaster mould or matrix, for producing cast plates with raised figures or patterns thereon.

After having gone over the whole of the lines or tracings of the design, the plaster mould is put into an oven or stove, and perfectly dried from all moisture; the frame and plaster mould is then placed in a cast iron or other metal box, of a proper depth, and the whole is dipped into a vessel containing fused metal of the proper qualities (such as lead and antimony, or type-founders' metal, used for producing stereotype plates).

A sufficient quantity of this metal is to be taken up by the plaster mould, and the box, to produce a plate, block, or casting, of the required thickness, which cast plate or block, after being allowed to set and cool, is taken out of the box or mould, and the surface of the raised design or pattern is gently and carefully rubbed

upon a stone, having a perfectly even surface, with very fine sand strewed over it, for the purpose of smoothing the surface of the raised figure or pattern, and removing any little inequality in the height of the raised design. And if the pattern should be found imperfect, the parts must be made good with metal, and properly dressed with a file, graver, or other suitable instrument.

Having described the method of producing the cast blocks, with raised designs, figures, or patterns thereon, for giving the first printing, or figure of the pattern, on to calicoes, stuffs, &c., that is, for producing the plain design on those fabrics, I shall proceed to describe the mode of obtaining the necessary colouring-blocks or plates, for putting on the different colours on various parts of the patterns or designs.

It will be understood that there are various ways of obtaining the different colouring blocks of the proper forms, from moulds made of plaster, clay, or suitable compositions; and I shall therefore proceed to describe, by way of example, two modes or methods of producing them, which I prefer.

I first prepare the required number of plaster or clay surfaces or blocks, according to the number of different colours to be used in the pattern or design; which plaster blocks are to form the moulds or matrixes for the different cast metal *colouring blocks,* containing the complete outline figure or design. The cast metal plate or block is then dipped into a colouring matter, and laid on to one of the prepared plaster surfaces, and it will leave an impression thereon of the complete outline of the pattern: when this is done, all those parts of the plaster surface which are within that part of the pattern or design, and are intended to be covered with a certain

colour, are to be removed by cutting, carving, scraping, or drilling the plaster surface away to an equal and even depth: this will form a second excavated or sunken plaster matrix or mould, into the excavations of which melted metal will be poured, as before described; and a colouring-block or plate, with a raised figure of all those parts intended to carry that one colour, will be produced. The colouring surfaces are then to be dressed as before, and ends for completing the colouring or finishing the design or pattern on the goods. The same process is performed with the next plaster surface for producing the *next colouring block* for another colour, or another part of the pattern or design, and so on till the whole of the necessary colouring blocks or plates are formed to complete the colouring of the pattern or design; the operation being repeated as many times as there are colours in the design or pattern.

Or, these colouring plates or blocks may be made by the following method, instead of that just described:—First, produce by means of a press or by weights, from the cast metal plate with the raised outline, design, or pattern, an impression in clay or argillaceous earth mixed with fine sand, or in any composition of paper pulp and clay, or other material which will form a suitable composition capable of receiving an impression (all the parts of the pattern or design intended to be coloured are sunken or broken in the cast metal plate, but in this impression they will be raised): then remove carefully with any sharp instrument, all those parts not intended to carry the colour of the first colouring block or plate, leaving only those parts which are to carry the first colour standing up from this first model in clay or composition. A second impression or mould is to be made in plaster, in which the raised parts left in the clay model will be hollow or

sunken; and this second plaster cast or mould is to be placed in the casting box, and used for producing the metal colouring block, by casting fluid metal in it. The same process being repeated for every colour, leaving only those parts standing up in the clay models which are to carry one colour each time. It will be seen by these means or methods of producing the colouring blocks, that the colourings will fit one into the other very perfectly, and fill up or complete the whole of the colouring of the pattern or design.

To produce cast plates or blocks with sunken or depressed figures or designs thereon, as in the manner of engravings or etchings produced by hand, by the graver or tracing point and aquafortis, I pursue the following method:—I first prepare a plate or block of fine plaster in a suitable frame of wood or metal, with a perfectly smooth and even surface; which surface, when the block is perfectly dry, is to be covered with a composition of pure wax and hard rosin, mixed in any suitable vessel by heat; the plaster block, with this composition spread upon its surface, is then to be subjected to heat until the mixture is absorbed by the plaster; and this process is to be repeated several times, until the smooth surface of the plaster, on being rubbed with a piece of soft linen, will bear a fine polish, and resist the action of the finger nail on scratching it.

The smooth surface of the plaster thus prepared, is ready to receive the finest lines of the design or pattern, which may be produced with the etching or tracing point or graver, or any cutting tools suitable to the purpose. After the design, pattern, or figure is completed, a soft linen rag steeped in oil, to which is added a small quantity of alcohol, is lightly passed over the whole of the smooth surface, the oil and alcohol being

allowed to penetrate into all the lines of the pattern or design. A second frame is then placed over the first, and sufficient fine plaster in a fluid state is poured into it upon the plaster model or design, by which a plaster cast is taken in relief of the lines of the pattern or drawing; which plaster cast forms the mould or matrix for producing a cast metal plate with a similar sunken design on it. The process of casting of the plate or block is similar to that already described, the only difference consists in substituting a metal of a harder nature or closer grain than required for the blocks or plates which have raised designs. This metal should approximate as near as possible to copper. A combination of copper, tin, antimony, and lead, will be found the best, the object being to obtain a mixture of metals of the greatest hardness when cold, but capable of being fused at from about 700° to 800° of Fahrenheit.

In the second part of my improvements, viz. the producing duplicates in metal of plates or blocks which have been formed by the foregoing method, or duplicates of plates or blocks used for printing calicoes, silks, stuffs, or other fabrics, or paper staining, which have been obtained by the ordinary process of producing such plates or blocks by hand, I pursue the following mode or method: after having lightly rubbed the plates or blocks with oil and alcohol, so that all parts of the printing or colouring surface are slightly coated with this mixture, an impression is taken from them either by pouring on to the printing or colouring surfaces liquid plaster, or by taking an impression or plaster cast with any suitable composition, made from paper pulp, sifted wood ashes, gum adraganth (gum dragon), or gum arabic, or with plaster or argillaceous earths, mixed with fine sand to prevent them shrinking in drying. Any

composition which will answer the purpose may be employed, and when dry, these impressions or casts form moulds for casting the duplicate metal blocks or plates.

The third feature of my improvement, viz. in the apparatus or instruments used in producing the design, pattern, or figure, on the original plaster or composition model from which the cast metallic plates or blocks are to be produced, consists in the application of a rotatory cutting tracer, drill, or piercer, furnished with cutting edges, which cuts or enters into the plaster block or plate, to a certain depth, and removes those parts intended to be occupied by the raised figure of the pattern or design; the depth of the cutting being regulated as required, thereby forming a sort of grooved or sunken engraving, which produces, by the after process of casting, the relieved or projecting parts forming the pattern of the printing block or plate. The instrument or apparatus for holding and actuating the rotatory piercers or drills is shown in figs. 33, and 34. Plate VIII., fig. 33, is a plan view; and fig. 34, a side elevation. It is composed of four bars *a*, *a*, *a*, *a*, of any suitable metal or substance, which are jointed together at their extremities at A, B, C, D, (somewhat similar to the bars of a pentagraph,) so as to form a parallelogram. The joint at A, is formed by the rotatory spindle or shaft *b*, (see fig. 34,) upon which also are mounted the small pulley *c*. On the upper ends of the pins of the joints at C, and D, are two small pulleys *d*, and *e*, turning loosely on the pins as their axis; and the other joint of the bars at D, is formed by the spindle or drill-holder *f*, upon which is mounted the pulley *g*. Around these four pulleys is passed a cord or silken thread *h*, by which any rotatory

motion given to the pulley *c*, is communicated to all the other pulleys in whatever position the instrument is placed. The two pulleys *d, e*, are merely guides to keep the cord or thread *h*, at equal tension at all times. The pulley *c*, is connected through the shaft *b*, with another larger pulley *i*, mounted on the same spindle *b*. To this pulley is communicated a rotary motion in the manner hereinafter mentioned, which, by means of the cord *h*, gives motion to the pulley *g*; to which is connected the cutting or excavating piercer or drill *k*: this drill being placed in the hollow spindle *f*, which forms the joint piece of the bars at D, and upon which the pulley *g*, is mounted. Rotary motion may be given to the spindle *b*, by a train of wheel-work, actuated by a coiled spring contained in a box or case placed on the stand *l*; or the same motion may be given to the rigger by a weight attached to one end of a cord *m*, the other end being wound round a drum, or the spindle may be turned by a winch-handle in any suitable manner. It is evident by these means, that any rotatory motion will be communicated to the cutting drill or piercer *k*, which penetrates into, and cuts out or removes the plaster or composition in any direction in which it is guided, so as to form an even and smooth excavation of the pattern, design, or figure, drawn or sketched upon the plaster surface.

The person operating with this instrument or apparatus, first fixes the stand *l*, firmly upon the table on which he works; and he then moves or passes the drill or cutting tool *k*, over all the lines of the pattern, drawing, or design on the plaster surface, and changes the sizes of the drills or cutting tools to suit lines of different thicknesses, which can be done by removing them

out of the hollow shaft, and placing others in their place. I would here remark, that it is not absolutely necessary to use this apparatus or instrument, as the parts requiring to be removed may be cut, scraped, carved, or excavated with any sharp and suitable instrument by hand.

In conclusion, I would remark, that there will be a great saving of time and hand labour, in producing blocks or plates for calico printing or paper staining: a plate may, by this improved mode or method, be finished in a few hours, which would by the usual process take many days. Also many duplicates of the same plate may be obtained without any other expense but that of casting; whereby the same pattern, or plate, or block, may be trusted to several printers at once, which is a very important matter when new patterns are issued, so as to get the market supplied before spurious goods can be produced. And further, the colouring will be performed with a neatness and accuracy seldom obtained by the present mode of block or plate printing in colours. Also the metal not being, like wood, effected by the change of temperature, or susceptible of injury by dampness, the plates will never require to be repaired or put to rights by the workmen before being again used, and the metal of old-fashioned plates may be re-cast into new ones.—[*Inrolled in the Rolls Chapel Office, November,* 1835.]

Specification drawn by Messrs. Newton and Berry.

To WILLIAM NEWTON, *of the Office for Patents, Chancery-lane, in the county of Middlesex, civil engineer, for an invention of certain improvements in preparing fibrous or textile plants, either indigenous or exotic, to be used in place of flax or hemp, being a communication from a foreigner residing abroad.*—[Sealed 17th February, 1835.]

THIS invention of improvements in preparing fibrous or textile plants, either indigenous or exotic, to be used in place of hemp or flax, has for its object the loosening or separating the bark, boom, or other extraneous matter from the fibres of textile plants, particularly phormium tenax, or New Zealand flax, and other textile plants capable of being used in place of hemp or flax; at the same time, separating the fibres of such plants, and thereby preparing them for heckling, and clearing them from the extraneous matter previous to the after process of twisting or spinning them into yarn; and consists in submitting such fibrous textile plants to a process of rolling, bruising, grinding, or breaking, by the pressure of a revolving crushing stone or metal roller (either plain or fluted) travelling round the mill on a bed of stone or iron, (either plain or fluted,) by which means the fibres of the phormium tenax, or other textile plants, become separated and softened; at the same time, the bark, boom, or other woody or extraneous matter becomes loosened or separated from the fibres, and the plant prepared for the after process of heckling.

Plate VIII., fig. 35, is a side view, representing the side of the roller or crusher: A, is the bed of the mill, which may be formed of stone, iron, or other material, with either a plain or fluted surface; B, is the

revolving crusher or stone, which has also a plain or fluted surface corresponding to the bed of the mill, and turns on its own axis, projecting from the shaft C, (mounted in proper bearings,) which is actuated through the bevelled wheels D, and E, put in motion by a band passing from a steam-engine or other motive power, thereby causing the roller to travel round on the bed of the mill. The phormium tenax, or other fibrous or textile plants, are first rolled or twisted into hanks or bunches, and then laid upon the bed of the mill, where they undergo a process of rolling, crushing, or breaking and loosening from the pressure of the crusher or roller B, which travels over them ; or the textile plants may be laid on the bed of the mill, without twisting them up into bunches. After submitting the fibrous plants to the process of rolling from three to seven or more hours, according to their nature and quality, they are to be removed to the heckling machine or frame, and heckled first in coarse heckles, and then in finer, and so on, in the usual manner of treating fibrous plants, until they are sufficiently heckled and freed from the bark, boom, or other extraneous matter for the after process of spinning.

Those parts of the fibrous plants which are found not to be sufficiently softened, crushed, or loosened, may be returned from time to time, between the different processes of heckling, to the mill, for a further process of rolling, crushing, or loosening, so as to perfectly prepare them for the finishing heckling and spinning, —[*Inrolled in the Rolls Chapel Office, August*, 1835.]

Specification drawn by Messrs. Newton and Berry.

SCIENTIFIC NOTICES.

(Continued from page 190.)

POLITICAL ECONOMY.—COMMISSION OF INQUIRY INSTITUTED BY ORDER OF THE FRENCH GOVERNMENT FOR THE REGULATION OF DUTIES UPON, OR PROHIBITION OF, FOREIGN MANUFACTURES, &c.

POTTERIES.

"We now arrive at the last four questions or subjects which were made the special or almost exclusive objects of the Inquiry. Materials do not fail us; indeed, we have rather to complain of their multiplicity; but we seek in vain to deduce from the conflicting opinions (of the advocates for free trade and their opponents) results based upon powerful motives and convincing positions." The observations of the French editor of the Memoirs as to the difficulty of legislating upon these conflicting interests, prove the importance of the Inquiry to our British manufacturers, especially to those concerned in the staple articles which form the subjects of the four questions which remain to be reported.

"In its most extended general acceptation, the word Pottery includes porcelain or china, brown stone ware, and that of pipe clay, earthenware of all sorts, and common clay ware." Upon this great branch of manufacture the Commission examined, or received documents from, many of the largest and most able manufacturers of France; they also examined M. S. Flachat, one of the editors of the *Courrier Francais*, and M. Clement Desormes, Professor of Chemistry at the Royal Conservatory of Arts and Trades. The examinations appear to have been conducted with a particular view to the effect which the allowance of the introduction of British pottery would have upon the French interests.

M. S. Flachat strongly advocated the substitution of an import duty for the prohibition affecting the introduction of brown stone ware and of pipe-clay ware of first qualities.

M. Clement Desormes was interrogated upon the difference between France and England as to the cost of prime materials

essential to the manufacture of pottery. He says, "these materials are as good and as cheap in France as elsewhere. The price of white or pipe clay is 1fr. the 100 kilograms (2 cwt.) on the spot. We consume at the manufactory of St. Gobain a great quantity of white clay, for which we pay 2fr. 50c. to 3fr. the 100 kilograms. From 100 kilograms an enormous quantity of plates may be manufactured, thus the first matters in these plates is scarcely any thing as affecting the sale prices. Flint and sand delivered at the works cost 2fr. to 3fr. the 100 kilograms. Workmanship is not dearer than in England, and coals are dearer only in some localities. It is to the want of energy or of perseverance among our artisans that we are to attribute the inferiority of our potteries. You may let the prohibition subsist eternally—it will advance nothing."

M. Guyon, a master potter, traced with much discrimination the relative situation of France and England in regard to their potteries. "The soil of England furnishes all the prime matters necessary for the art of pottery, and principally fuel, at a very low price. France does not abound in clays fitted for the better sorts of earthenware, and the white clays are often at a distance from the places of manufacture. Fuel is scarcer, and much dearer than in England. The geographical situation of England, surrounded by water, gives a facility of transportation from one county to another, both of the matters employed and of fuel. By the industry and the associating spirit of its inhabitants, its surface is found pierced with canals, and traversed with iron railways, which cheapen and facilitate conveyance to the interior. In France, the spirit of association has not yet given birth to similar grand undertakings—the communications are difficult and expensive. No iron railroads, few canals, rivers navigable only for half the year, oppressive duties upon this navigation; finally, maritime communication impossible upon three quarters of our frontiers. From these differences between the means of the two countries, *it is impossible for France to manufacture its pottery at the low price at which the English can produce theirs.* Added to this,

England possesses rich mines of lead and tin—the base of enamels, for glazing.

"The commerce of England almost monopolises the trade in potasses and alkalies, which cannot be dispensed with in the manufacture of pottery. Its collieries are more abundant and of better quality than the richest of ours. Pit-coal, which adds to the costs of our manufactures 2fr. to 3fr. the hectolitre, does not cost 75c. to the English potteries. The low price of coal enables them to employ steam-engines to pound their matters and glazing materials. From these considerations it is easy to judge that the English manufacture pottery much below the price of French articles, although the wages of the workmen may be nearly the same in the two countries, for English journeymen are almost daily applying for employment at our establishments, in the hopes of obtaining better wages here."

CHINA OR PORCELAIN.

The present number of the French china-works alone is thirty-one. Ten years ago, the produce of their porcelain manufacture amounted to six or eight millions of francs, about 240,000*l.* to 320,000*l.* sterling; at present the total value of their china manufactured is under one-half of the former amount, and yet at least as large a quantity is now made as formerly was supplied. The difference is solely attributable to the depreciation which has occurred in the prices. One dozen of china plates, which then sold at from 10fr. to 12fr., may be now obtained at 5fr. 50c. or 6fr.

Upon questions relative to the admission into France of foreign brown stone ware, and of pipe-clay ware (Staffordshire pottery), M. Honoré, a china manufacturer, answers, "If the actual prohibition be not replaced by an import duty sufficiently high, our white clay potteries will be annihilated: this branch of our industry is forty to fifty years in arrear. As to our porcelains, they may at present compete with the English china in foreign markets; but if you permit the introduction to France—to Paris, of English Staffordshire ware, painted in blues, which are at a

very low price, well glazed, and of a highly pleasant appearance, you will reduce the price of our porcelain to a very low price—under six or seven francs for the dozen of plates, for you may obtain in England for two shillings and sixpence, a dozen* of blue Staffordshire plates.

"We deliver our china plates at 6fr. 50c. the dozen, allowing 5 per cent. abatement, and 5 per cent. discount. I deliver from my kilns 18,000 plates per month: in interfering with this branch, you will destroy the support of our concern.

"Our pipe-clay potteries are in a most unfavourable situation to contest with England, they are still far from employing all the processes which are used in England, and they have only lately used pit-coal, the most economical fuel for our purposes. We strive against the disadvantage of transport: our potteries are almost all of them at a distance from Paris, the principal mart of consumption: the expenses of transport are considerable. In England, on the contrary, conveyance is easy, and pit-coal very cheap. Our manufactories not having, therefore, the advantages which those of England possess, you will destroy this branch if it be not protected by a sufficiently heavy duty.

"Q. You do not then attribute this inferiority to the workmanship and the manner of the processes?—A. I have observed that our potteries are fifty years in arrear, and I think it would require ten years to put them in a situation of superiority. Our makers require to be stimulated, they should be obliged to make some efforts to quit their present routine—they have been too inert; if you would advance them, take off the prohibition. I desire that the duty upon imported pottery should be sufficiently high; we should obtain patterns, and our manufacturers would be incited to make advances. For some years past, the English have glutted us with china tea-services, gilded, painted with red and blue, which our retail shops sell at 72fr. to 80fr., 6*l.* to 6*l.* 6*s.*, at a great profit, for they buy them in England at 25 to 30 shillings. Since this time, I sell only costly services,—the sale of common sets has ceased.

* La demi-douzaine appears to be a mistake.

"Q. And yet you sustain a competition in foreign markets?—A. Yes, of objects in which we have been forced to rival them—in articles in which we have not striven to compete with them, they retain the advantage. We send to America, china of particular shapes: for three or four years past, I have manufactured patterns resembling the English, which the Americans have sent to me, and I can deliver these at a price competing with the English. I have commenced manufacturing similar tea-services to the English, at 36fr. to 40fr., and for some months I have sent them to foreign markets; but I do not know that I shall obtain the advantage over the English manufactures. I propose putting an import duty of 164fr. upon the 100 kilograms of common porcelain, which, at the present price, will be 164 per cent.

"Q. Do you ship china to England?—A. Yes; but only of the more valuable sorts. The white china of England and that of France is nearly of the same price, as far as I can learn. To our common china, the English oppose, with success, their beautiful and excellent Staffordshire ware (terre de pipe), and their *iron-stone china*, ornamented with blue patterns, which is of high repute: these two descriptions are attainable at a very moderate price, and we cannot sustain a competition with them."

M. Honoré, after this able statement of the relative situation of the French and English potteries and china works, concludes with some information upon their trade with Belgium, which he says is inconsiderable, on account of the excessive duties, amounting to cent. per cent. upon the value, although actually taken upon the weight, including the accidental breaking in the packages, which, with other causes, closes the Belgic market against France.

FINE BROWN STONE WARE AND EARTHENWARE (TERRE DE PIPE).

These two species are alone prohibited: they have, therefore, formed the more direct object of the Commission of Inquiry and of our attention.

M. de St. Cricq Caseaux, master potter, examined.—He stated "that France had twelve potteries for the manufacture of earthen ware upon a large scale, besides a number of small ones, spread

over the several departments; they manufactured to the amount of about five millions per annum (200,000*l.*). At the time of the restoration, there existed in France only the potteries of Mont Creau, Criel, and Choisy, which together produced annually from two to three millions of francs from their concerns.

"Q. Notwithstanding the late advances in this branch, do you not consider it in an inferior state comparatively to England?—A. We must distinguish between earthenware and demi-porcelain, or opaque china—the difference is well defined. The manufacture of earthenware is inferior in France. England consumes more of inferior pottery than we do; its consumption is principally of earthenware, its manufacture of china small. In France porcelain is abundant and cheap, but still its poor population use large quantities of common earthenware (faience); those better off use fine earthenware. The English potteries have the advantage of ours to the amount of 20 per cent. upon the manufacture of earthenware, besides that of cheap transport; our expenses of conveyance upon rivers and canals have lately been increased by an additional tax upon their navigation. One of the principal causes of the cheapness of the English earthenware (Staffordshire), ist heir superior mines of pipe clay, extending over many leagues of surface. A ton of pipe clay (500 kilograms) costs them only ten francs; they also possess separate establishments for the pounding of flints, which are much cheaper to them. Pit-coal is four times dearer to us than to the English; manual labour in this branch of manufacture is also cheaper with them: they have had one hundred and fifty years' experience in these works; our oldest potteries are of thirty years' standing, others of scarcely twelve or fifteen years. Our *porcelaine opaque* is an article of the quality of the English iron-stone, it is a superior kind of pottery. The English possess the great advantage of disposing of their worst manufactured articles by means of their shipping to all parts of the globe, where they find less duties to pay than here. The total annual amount of the produce of the English potteries is valued at 58 millions (about 2,320,000*l.* sterling).

"We ship to Martinique and to Guadaloupe, because they are our possessions. Some of our manufacturers ship occasionally to America, certain goods which the English do not get up with so much elegance. Our brown stone ware for flower-pots, common tea-services, &c., unglazed, do not amount to above 20 to 25,000fr. per annum."

Upon the subject of a protecting duty, this gentleman recommended, that in the course of three years the prohibition should be taken off, and an import duty upon earthenware of 20 to 30 per cent. be levied; which allowing for frauds, calculated at one-fourth to a fifth, he deemed would be a sufficient protection to their trade. He then called the attention of the Council-General to the differences between the French and English potteries, in regard to the number of workmen employed, and their treatment. "Our operatives," he observed, "amount to the number of 3000 in the several potteries, without reckoning those which are employed out of the establishments. Our workmen will not be treated as in England, where thousands of men in the workshops labour during the winter without firing: we provide superior workshops, and the capitals employed are proportionately larger in a given establishment. Three years should be allowed for the substitution of a protecting duty in lieu of the prohibition.

Mr. Hautin stated "that the wages of the workmen in the potteries were generally higher than in England; they were very high about Paris, where the men served an apprenticeship of five or six years. By the piece they obtained 5fr., 6fr., to 10fr. per diem; the operatives in the workshops, 2fr. to 2.50fr. per diem. We pay 15 sous, 7½d. per hundred of plates to a man and his servant, who can make 400 to 500 per day. We are not much dearer in plates than the English, but for moulded pieces our operatives are paid much higher than in England, and they are less skilful, which makes an immense difference. Our moulded pieces take up much room in the furnaces compared to plates, and a much greater proportionate consumption of fuel is required.

"Q. The opaque porcelain which you manufacture, answers to

the iron-stone ware of the English; what duty do you think necessary for the protection of this branch of manufacture?—A. The opaque china is admirable, it is an excellent pottery; I have made it for three years past, but at present I do not make any—the inquiry has caused me to suspend my projects. I was about to erect a steam-engine at an expense of 80,000fr., but I now wait the result of the inquiry. If I do not obtain my object, a sufficient protecting duty, I shall not feel disposed to sink an additional 80,000fr. (3200*l.*) in the establishment at Montereau. I am the only manufacturer who makes blue plates, in which branch I can compete with the English, for I make them to certain profit; but I cannot strive with the English in moulded pieces. However excellent the opaque china may be, it does not yet form a branch of commerce—it will extend, no doubt; other manufacturers will take it up; but at present we require a protection principally to our earthenware."

The Chamber of Commerce of Caen was of opinion, that foreign pottery of the superior kind might be admitted at a certain fixed duty, which it did not indicate.

M. Guyon, a manufacturer, at Gien, held the contrary opinion. "We think (speaking for his firm) that the introduction of English pottery, even with a high import duty, cannot take place without causing a ruinous crisis to the industry of France; our manufactures are approximating the English in solidity, and they are all in a state of progression."

ORDINARY POTTERY AND COMMON CLAY WARE.

These kinds are not prohibited, and do not appear to have engaged much of the attention of the Councils; it is upon the introduction of our Staffordshire ware that the direct collision takes place between the free-trade advocates and the manufacturers. The principal ordinary ware potteries are in the south of France. All the southern potteries employ a total of about 4000 workmen, whose wages constitute about 20 to 25 per cent. upon the value of the goods manufactured, excepting in the articles manufactured for the sugar refineries, upon which the

workmen's wages amount to 50 per cent. Almost all the products of the potteries in the four southern departments find their sale at the port of Marseilles, from whence pots and moulds for the refiners are shipped in large quantities.

The French potteries are subjected to a most impolitic tax of 50 centimes upon fine wares per 100 kilograms, and of 25 centimes upon the common goods upon export, which the southern manufacturers wish abrogated or greatly reduced. The necessity for the immediate repeal of this tax is strongly insisted upon by the editors of the *Recueil Industriel*, from the 17th No., 2d Series: of which work we have condensed the very interesting report which we present to our readers upon this important subject. The final decision of the question in favour of the admission of our Staffordshire ware to France, would certainly give a great impetus to this extensive branch of our national staple manufactures.

Sixth Question, On the Glass Works, in our next Number.—Ed.

New Patents
SEALED IN ENGLAND,
May, 1836.

To William Preston, of Sunnyside, in the county of Lancaster, operative calico printer, for his invention of certain improvements in printing calico and other fabrics.—Sealed 28th April—6 months for inrolment.

To John Burn Smith, of Salford, in the county of Lancaster, cotton spinner, for his invention of certain improvements in the machinery for roving, spinning, and twisting cotton, and other fibrous substances.—Sealed 30th April—6 months for inrolment.

To John Whiting, of Rodney-buildings, New Kent-road, in the county of Surrey, doctor of medicine, for his

invention of an improvement or improvements in preparing certain farinaceous food.—Sealed 3rd May—6 months for inrolment.

To John Macneil, of Parliament-street, in the county of Middlesex, civil engineer, for his invention of improvements in making or mending turnpike or common roads.—Sealed 3rd May—6 months for inrolment.

To Henry Sharpe, of Broad-street-buildings, in the city of London, merchant, for improvements in sawing wood and other materials, being a communicatiom from a foreigner residing abroad.—Sealed 3rd May—6 months for inrolment.

To William Sneath, of Ison-green, in the county of Nottingham, lace maker, for his invention of certain improvements in machinery, by aid of which improvements thread-work ornaments of certain kinds can be formed in net or lace made by certain machinery, commonly called bobbin-net machinery—Sealed 3rd May—6 months for inrolment.

To William Augustus Howell, of Ramsgate, in the county of Kent, smith and ironmonger, for his invention of certain improvements in the construction of springs for doors.—Sealed 3rd May—6 months for inrolment.

To Thomas Henry Russell, of Tooks-court, in the city of London, tube maker, for his invention of improvements in making or manufacturing welded iron tubes.—Sealed 3rd May—6 months for inrolment.

To Edmund Pontifex, of Shoe-lane, in the city of London, coppersmith, for an improvement in the process of making and refining sugar, being a communication from a foreigner residing abroad.—Sealed 5th May—6 months for inrolment.

To Joseph Banister, of Colchester, in the county of Essex, watch maker, for his invention of improvements

in watches and other time-keepers.—Sealed 7th May—6 months for inrolment.

To John Elvey, of the city of Canterbury, in the county of Kent, millwright, for his invention of certain improvements in steam-engines.—Sealed 7th May—6 months for inrolment.

To Matthew Hawthornthwaite, of Kendal, in the county of Westmoreland, weaver, for his invention of a new mode of producing certain patterns in certain woven goods.—Sealed 7th May—6 months for inrolment.

To Thomas Taylor, of Banbury, in the county of Oxford, saddler and harness maker, for his invention of certain improvements in saddles, for riding.—Sealed 7th May—6 months for inrolment.

To Luke Hebert, of 20, Paternoster-row, in the city of London, for improvements in horse collars, being a communication from a foreigner residing abroad.—Sealed 9th May—6 months for inrolment.

To John Hague, of Cable-street, Wellclose-square, in the parish of St. George in the East, in the county of Middlesex, engineer, for his invention of an improvement for raising water, by the application and arrangement of a well-known power, from mines, excavations, holds of ships or vessels, and other places, where water may be deposited or accumulated, whether from accidental or natural causes, and also applying such power to and in giving motion to certain machinery.—Sealed 9th May—2 months for inrolment.

To Richard Waddington and John Hardman, of Bradford, in the county of York, iron founders, for their invention of an improved method of making and constructing wheels for railway carriages.—Sealed 10th May—6 months for inrolment.

To Richard Birkin, of the parish of Basford, in the county of Nottingham, lace manufacturer, for his invention of certain improvements in machinery for making lace, commonly called ornamented bobbin-net lace.—Sealed 11th May—6 months for inrolment.

To Richard Wilson, of Blyth Sheds, in the county of Northumberland, builder, for his invention of improvements in making or manufacturing fire-places, slabs, columns, monuments, and cornices, such as have heretofore been made of marble.—Sealed 12th May—6 months for inrolment.

To Thomas Grahame, of Nantes, in the kingdom of France, but now of Suffolk-street, Pall Mall, in the county of Middlesex, gentleman, for his invention of improvements in passing boats and other bodies from one level to another.—Sealed 13th May—6 months for inrolment.

To John Ashdowne, of Tunbridge, in the county of Kent, gentleman, for his invention of improvements in apparatus to be added to wheels to facilitate the draft of carriages on turnpike and common roads.—Sealed 13th May—6 months for inrolment.

To Wheatley Kirk, of Commercial-street, Leeds, in the West Riding of the county of York, music seller, and manufacturer of piano-fortes, for his invention of certain improvements in piano-fortes.—Sealed 14th May —6 months for inrolment.

To Joseph Whitworth, of Manchester, in the county of Lancaster, engineer, for his invention of certain improvements in machinery for spinning and doubling cotton, wool, and other fibrous substances.—Sealed 17th May—6 months for inrolment.

To David Fisher, of Wolverhampton, in the county of Stafford, mechanic, for his invention of an improve-

ment in steam-engines.—Sealed 17th May—6 months for inrolment.

To Henry Walker Wood, of 29, Austin-friars, in the city of London, merchant, for his invention of certain improvements in certain locomotive apparatus. —Sealed 17th May—6 months for inrolment.

To James Brown, of Esk Mills, in the parish of Pennycuick, North Britain, paper maker, for his invention of a certain improvement or certain improvements in machinery or apparatus for making paper.—Sealed 18th May—6 months for inrolment.

To Thomas Beck, of the parish of Little Stoneham, in the county of Suffolk, gentleman, for new or improved apparatus or mechanism for obtaining power and motion to be used as a mechanical agent generally, which he intends to denominate Rotæ vivæ.—Sealed 18th May —6 months for inrolment.

To Piere Barthelemy Guinibert Debac, of Brixton, in the county of Surrey, civil engineer, for his invention of improvements in railways.—Sealed 18th May—6 months for inrolment.

To Henry Elkington, of Birmingham, in the county of Warwick, gentleman, for his invention of an improved rotary steam engine.—Sealed 23rd May—6 months for inrolment.

To William Watson, of Leeds, in the county of York, dyer, for his invention of an improvement in dyeing hats, by the application of certain chemical matters, never before applied to that purpose.—Sealed 24th May—6 months for inrolment.

CELESTIAL PHENOMENA, FOR JUNE, 1836.

D.	H.	M.	
1			Clock after the ☉ 2m. 32s.
—			☽ rises 11h. 4m. A.
—			☽ passes mer. 1h. 23m. M.
—			☽ sets 4h. 49m. M.
3			Occul. 35 Capri, im. 14h. 1m.
4	20	27	♅ in conj. with the ☽ diff. of dec. 4. 40. N.
5			Clock after the ☉ 1m. 53s.
—			☽ rises 0h. 49m. M.
—			☽ passes mer. 5h. 25m. M.
—			☽ sets 10h. 14m. M.
6	7		☽ in □ or last quarter.
8	12	0	♅ stationary.
	22	35	☿ in the descending node.
10			Clock after the ☉ 0m. 57s.
—			☽ rises 1h. 58s. M.
—			☽ passes mer. 9h. 6s. M.
—			☽ sets 4h. 31m. A.
13	8	32	☿ stationary.
14	5	37	Ecliptic conj. or ● new moon.
	5		☽ in Apogee.
15			Clock before the ☉ 0m. 5s:
—			☽ rises 4h. 8m. M.
—			☽ passes mer. 1h. 3m. A.
—			☽ sets 9h. 58m. A.
17			Mercury R. A. 6h. 42m. dec. 20. 57. N.
—			Venus R. A. 8h. 36m. dec. 19. 54. N.
—			Mars R. A. 2h. 56m. dec. 16. 7. N.
—			Vesta R. A. 12h. 0m. dec. 3. 38. N.
—			Juno R. A. 8h. 55m. dec. 13. 17. N
—			Pallas R. A. 21h. 33m. dec. 14. 50. N.
—			Ceres R. A. 23h. 41m. dec. 14. 1. S.
17			Jupiter R. A. 7h. 27m. dec. 22. 15. N.
—			Saturn R. A. 13h. 50m. dec. 8. 36. S.
—			Georg. R. A. 22h. 26m. dec. 10. 35. S.
—			☿ passes mer. 0h. 58m.
—			♀ passes mer. 2h. 52m.
—			♂ passes mer. 21h. 12m.
—			♃ passes mer. 1h. 41m.
	7	3	♀ in conj. with the ☽ diff. of dec. 3. 58. S.
18	10	55	♀ at greatest brilliancy.
19	1	57	☿ in Aphelion.
20			Clock before the ☉ 1m. 10s.
—			☽ rises 9h. 42m. M.
—			☽ passes mer. 5h. 2m. A.
—			☽ sets morn.
	22	41	☉ enters Cancer, Summer commences.
22	5	53	☽ in □ or first quarter.
23	20	1	♄ in conj. with the ☽ diff. of dec. 0. 49. N.
25			Clock before the ☉ 2m. 14s.
—			☽ rises 4h. 22m. A.
—			☽ passes mer. 8h. 57m. A.
—			☽ sets 1h. 1m. M.
	7	50	♀ in the descending node.
26	11	27	☿ in inf. conj. with the ☉
28	5		☽ in Perigee.
	10	57	Ecliptic oppo. or ○ full moon.
29			Occul. ω Sagitt. im. 12h. 37m., em. 13h. 22m.
—			Occul. α Sagitt., im. 14h. 3m., em. 15h. 1m.
30			Clock before the ☉ 3m. 15s.
—			☽ rises 10h. 23m. A.
—			☽ passes mer. 1h. 14m. M.
—			☽ sets 4h. 51m. M.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR APRIL AND MAY, 1836.

1836.	Thermo.		Barometer.		Rain in inches.	1836.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low.	
April						May					
26.	52	35	30,03	29,81		11	68	25	30,12	30,07	
27	49	30	29,86	29,71		12	67	34	30,22	30,08	
28	53	28	29,87	29,75	,05	13	70	33	30,28	30,22	
29	47	27	29,82	29,77		14	68	36	30,48	30,40	
30	51	24	29,72	29,67		15	70	34	30,48	30,44	
May						16	73	36	30,44	30,42	
1	54	26	29,81	29,71		17	71	38	30,43	30,42	
2	57	35	29,88	29,78		18	70	39	30,31	30,24	
3	54	35	29,92	29,79		19	63	44	30,23	30,13	
4	54	38	29,67	29,64	,075	20	72	34	30,06	29,94	
5	49	36	29,80	29,64	,45	21	60	43	29,95	29,91	
6	57	34	30,13	29,96	,35	22	60	32	29,95	29,86	
7	55	32	30,20	30,17		23	63	37	29,89	29,79	
8	59	37	30,19	30,16		24	62	40	30,12	29,99	
9	50	38	30,15	30,12		25	61	34	30,15	30,14	
10	59	35	30,12	Staty.							

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

JOURNAL AND REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. LII.

Recent Patents.

To WILLIAM CROFTS, *of New Radford, in the county of Nottingham, machine maker, for his invention of certain improvements incer tain machines for making figured or ornamented bobbin net, or what is commonly called ornamented bobbin-net lace.*—[Sealed 20th November, 1834.]

THIS is one of the many patents for making lace recently obtained on behalf of a wealthy firm in Nottingham, which is considered by the trade of so sweeping a character, as to aim at a monopoly in the manufacture of a certain kind or pattern of figured net called *honey-comb open work,* whether produced by the means herein proposed, or by any other means or machinery that has been heretofore employed, or which may be hereafter devised for a similar purpose, excepting one particular kind of machine (the *traverse warp*), which has been

applied and patented by other parties for the same object.

The specification, like most of those issuing from the same source, is of enormous length, and the invention, if invention it may be called, is set out with such irksome prolixity and useless repetition, that we would gladly have saved our readers the labour of wading through even a portion of so barren a wilderness, by substituting a concise epitome of its leading feature or object; but the patent has already become a subject of legal investigation, and therefore we feel reluctantly obliged to give a larger extract of the matter in its literal form than either the subject appears to merit, or our limits will conveniently allow.

The descriptive part of the specification commences by setting out, first, the sort of machinery to which the improvements are applicable, viz. to all constructions of machinery in which the bobbin carriage traverses, that is all, strictly called, bobbin net machinery, except the traverse warp. It would have been extremely satisfactory, if, with equal precision, it had also set out what the improvements really are. But we proceed to our extract of the introductory part, and shall then describe the several parts of the machinery referring to the figures of the drawings.

My said improvements are applicable to that kind or class of bobbin-net machinery which *traverses the carriages*, that is to say, the diagonal or traversing threads of the bobbin net made by such machinery are bobbin threads, the latter being so named because they are supplied from the small narrow bobbins which are mounted in the bobbin carriages, and which bobbins having peculiar and appropriate movements given to their bobbin carriages by the action of the machinery, their bobbin threads become twisted around the warp threads which are to proceed longitudinally along the lengthways of the bobbin net, which net is formed by such twistings, combined with mutual crossings, which the same bobbin threads are caused to make over each other at intervals, between the

successive twistings, and it is by such mutual crossings that the bobbin threads proceed across the width of the net in diagonal directions with contrary obliquities from selvedge to selvedge of the net; and it is the said oblique diagonal crossings of the bobbin threads which form the upper and lower sides of each hexagonal mesh, whilst the four inclining sides or pillars of each such mesh are formed by the aforesaid twistings of the bobbin threads around the warp threads.

And such machinery having my improvements applied thereto in manner hereinafter described, will be enabled to make figured or ornamental bobbin net, or what is commonly called ornamented bobbin-net lace, of a certain kind, which, from its resemblance to the cells of honeycombs, is termed honeycomb open work; and which, if composed of intermixed meshes of larger size and of smaller size than the ordinary meshes of the bobbin net, which would be made by the same machinery operating in its usual manner, the enlarged meshes are regularly disposed and interspersed amongst the smaller meshes, in such manner that each enlarged mesh is surrounded by six o the contracted meshes, one of the latter being situated on each of the six sides of every enlarged mesh. The appearance of such honeycomb open work to the eye is somewhat similar to that which is termed Grecian net, except being in miniature, for the enlarged meshes of the honeycomb open work are less disproportioned to the ordinary meshes of the net than in the Grecian net, in which each large mesh is surrounded by ten small meshes, and the contracted meshes in honeycomb open work are smaller than the ordinary meshes of the net; but in Grecian net the small meshes are merely as large as the ordinary meshes of the bobbin net which the same machinery would make when worked in its usual manner. And my improvements being applied in manner hereinafter described to bobbin-net machinery which traverses the carriages for the purpose of making bobbin net which is figured or ornamented with honeycomb open work as aforesaid, may be also combined with other apparatus which is well known and commonly used in bobbin-net machinery, for inserting what are termed tapings into the net, and which are formed by extra longitudinal threads introduced and worked into the net, so as to pass longitudinally over or through the openings of particular meshes and longitudinal rows of meshes, in order to fill up such rows of meshes, and give the appearance of longitudinal stripes of thread in the net; and when several such taping threads are introduced side by side, so as to fill up as many adjacent meshes of the net, the longitudinal stripe which they make along the net will have the appearance of a narrow tape; and by combining the ordinary

taping apparatus with my improvements in manner hereinafter described, taping threads may be interwoven into the midst of the honeycomb open work, so as to proceed over or through the small meshes thereof, in order to partly fill them up; and then the openings of the enlarged meshes being contrasted to the filling up of the contracted meshes will be rendered more apparent to the eye, and also the taping threads being suitably interwoven amongst the small meshes will tend to contract and diminish their size, as well as to fill up their openings by passing through the same; and the taping threads will, at the same time, tend to draw, open, and expand the enlarged meshes, and the small meshes being contracted and filled up with such taping threads, will be scarcely perceptible as meshes, but will present the appearance of bordering around the enlarged meshes, so as to occasion that resemblance to the cells of a honeycomb, from which the ornamented open work has derived its name——.

And the machinery to which my improvements are applied being worked with suitable apparatus, such as is usually employed in like machinery for making the net in narrow breadths with firm selvedges at each edge of each breadth, to form what are commonly called bobbin-net laces; such laces may, by aid of my improvements, be ornamented by a stripe, or by parallel stripes of honeycomb open work proceeding longitudinally along each breadth of lace, and occupying the whole or any required part of the width thereof; the parts which are not so occupied, being ordinary bobbin net.

[Here follows a long detail, explaining that the selvedges of many breadths are united in one sheet by whipping threads.]

And similar open work with taping threads has also been produced in breadth of bobbin-net lace made by traverse warp machinery, by the aid of certain improvements therein, for which, amongst other improvements, a patent was granted by his present Majesty to Messrs. Nunn, Mowbray, and Alibone, on the 7th of February, 1833,* but the mode described in the specification which they inrolled in pursuance of that patent, is not applicable to machinery which taverses the carriages but only to traverse warp machinery, wherein the bobbin threads form the longitudinal threads in the net, and the warp threads form the diagonal traversing threads thereof.

[Here follows a description of the ordinary movements of lace machinery, and then the Patentee proceeds to state:]

This, which is the ordinary action of traversing carriages being understood, the construction and operation of my improvements may be stated as follows:—I cut out or remove

* This must be intended for the patent of 27th of February, 1833; for the specification of which see vol. v. of our present series, p. 358.

from the row or rows of ordinary main guides for the warp threads, all the guides belonging to those particular warp threads, whereof the twists form the pillars of the meshes, which are to be enlarged for the intended honeycomb open work; and I thread those particular warp threads through the eyes of other filling-up guides, which are affixed to extra guide bars, so as to be capable of distinct racking motions from those of the main guide bar or bars for the ordinary main guides, through the eyes of which all the other warp threads are threaded as usual, for making all those parts of the ornamented net where its meshes are to be as usual in bobbin net: and I make the said filling-up guides, which are fixed on the extra guide bars, to range in regular continuation, for filling up the places of the guides, which are cut out or removed as aforesaid, from the main guide bar or bars, so that the main guides, together with their filling-up guides, will hold all the warp threads truly spaced in regular order in an unbroken row or rows, just as usual; and nearly all the several racking motions which are usually given to the main guides, for causing the bobbing threads to twist around them, must be given to the filling-up guides, the same as to the main guides, without much distinction between the main guides and filling-up guides, whilst those evolutions are performing which are solely for the purpose of forming the twists. And the action of my improvements is to give such unusual and temporary racking motions to the said filling-up guides, as are necessary to counteract for a time the effect of that mutual exchange of correspondences between the bobbin threads and warp threads; which results (as before explained) from the ordinary traversing and transposition of the carriages: for when by the traversing of the carriages the bobbin threads (in the usual course of working) are made to exchange their previous correspondents amongst the warp threads, those particular warp threads which belong to the open work are, by my improvements, racked so differently from the other warp threads (which belong to the ordinary net work), that the said particular warp threads will, for a time, preserve their previous correspondences with the bobbin threads, notwithstanding the transposition which the bobbin threads have undergone by traversing; because by the action of my improvements, the said particular warp threads will have undergone a like transposition, so as to have accompanied their previously corresponding bobbin threads in their transposition: consequently when the bobbin threads resume their twisting operations, after having been traversed, those particular warp threads which belong to the open work having been transposed equally with the bobbin threads which form twists around them before the traversing the said bobbin threads will go on twisting around the same warp threads that they twisted round before the traversing, so as to prolong and continue the same identical twists which were in progress of formation before the traversing: nevertheless, the other warp threads which do not belong to the open work (but to those parts of the net where the meshes are to

be of the usual size), begin after the traversing to be twisted by different bobbin threads, from which twisted around them before the traversing, and are therefore in progress of commencing new twists instead of continuing the former ones: and it is by such prolongation of particular twists that the enlarged meshes are formed their twisted pillars being composed of a greater number of twists than the pillars of the ordinary meshes of bobbin-net lace, which will be intermixed amongst the enlarged meshes. The details of the mode of carrying my improvements into effect must be varied to suit the different kinds of bobbin-net machinery which they are applied to, and incorporated with, for the purpose of forming honeycomb open work in the net made thereby. And for full explanation of the manner of applying my improvements to different machines which traverse the carriages, I have hereunto annexed eight sheets of drawings representing such machinery as is most suitable for the said application, and which will serve for example in other cases. Plate IX. figs. 1, 2, and 3, represent what is termed a circular bolt or circular comb machine with rotary mechanism, by which all the parts are put in motion, from the continuous revolving motion of a double winch or turning handle, situated in front, in a convenient position to be turned by the hands of the workman.

"The section, fig. 1, shows the two main guide bars *t*, *t*, with their leads of guides F, G, screwed to them as usual; but the guides are cut out from those leads, as is shown at figure F. at every place where a stripe of honeycomb open work is intended to be made in the width of the net, and all the warp threads belonging to the open work are threaded through extra filling-up guides 25, 26, 27, and 28, which are fixed on from extra guide bars 1, 2 3, and 4; two in front for filling up the vacancies in the row of front guides, and two at the back for filling up the vacancies in the back guides. The number of main guides which are cut out of each row F, G, is equal to the number of enlarged meshes which are required to be made in the stripe of open work, counting across the width thereof, and each of the rows of filling-up guides 25. 26, 27. or 28, have half as many as that number; the filling guides of one row 25, or 27, being interpersed between those of the other row 26, or 28; and the two rows of interspaced filling guides being placed in each of the vacancies in the main guides F, G, will fill up the same, and all the warp threads will be held in complete unbroken rows as usual; but, nevertheless, either of the rows of filling guides 25, or 26, 27, or 28 can, when required, be racked independently of the rows of main guides F, G, to which they belong, although at other times they will be racked coincidently therewith. The racking motions are given to the filling guide bars, 1, 2, 3, and 4, by extra racking wheels, 5, 6, and 7, 8, which go only once round, whilst two rows or courses of complete meshes of net are formed: and whilst the ordinary racking wheels on the upright axis on the right hand end of the machine go twice round, the said extra racking

Wheels, 5, 6, and 7, 8, are fixed on a horizontal axis 9, situated at the lower part of the machine beneath the main axis of the driving cams and turned round by means of a large spur cog wheel, 10, of 120 teeth, which is engaged by the usual pinion or, of 20 teeth, on the main axis of the driving cams, and which pinion also turns the usual taking up wheels for actuating the point bars. The racking motions are given by lateral steps, or elevations and depressions of the prominent rims at the circumferences of the wheels 5, 6, and 7, 8, being two such racking rims on each wheel: and those motions are transmitted to the extra guide bars 1, 2, 3, 4, by upright levers, 11, 12, 13, and 14, two in the front and two at the back: they are poised on horizontal fixed centre pins, which are sustained by fixed bars of the framing; and each of those levers has a projecting tooth at its lower end, which applies to the laterally indented rims of its racking wheels; and at its upper end is a gage screw to act against a stump projecting down from that extra guide bar, which the lever is intended to actuate with racking motions and suitable springs are applied to each bar to re-act against the racking wheel from which it derives its racking motions. The said extra guide bars 1, 2 and 3, 4, are supported upon axles at each end of each bar, which are lodged in suitable bearing brackets, affixed to the framing with such supporting bearings in the middle as may be required to keep the bars from bending. The filling guides may be soldered into stems of brass plate, which are bended to a suitable shape, and fastened upon their guide bar by screws in the usual manner of applying extra guides; see figs. 25, and 26. The innermost rows of filling guides 25, belonging to the bars 1, and 2, are bended, so that their eyes will range with those of the main guides, fig F, being included within their vacancies, and having room for racking one space therein; but the two outermost rows of filling guides 26, and 28, belonging to the bars 3, and 4, are kept quite clear of the main guides F, and G, so as to be capable of racking independently thereof, without interference; and for this purpose the outermost filing guides 26, and 28, may be turned flatwise, as shown in fig. 26; all the warp threads are conducted in the usual manner, up through the central space, between the two main guide bars *t*, *t*, and part of them are threaded through the eyes of the filling guides 25, 26, from the warp roller, the others being threaded through the main guides F, G. For the most part, the operation of filling guides 25, 26 requires to be exactly the same as that of the main guides F, G, to which they belong respectively; and, therefore, the steps of the racking wheels 5, 6, and 7, 8, are cut so as to rack the extra guide bars 1, 2, 3, and 4, at the same time, and in the same direction, and the same distance, as the ordinary guide bar wheels H, rack their main guide bars *t*, *t*, excepting at particular periods of the course of operations by which two successive rows of complete meshes of net are worked; and then the filling guides, 25, 26, require to be racked differently from the rows of main guides F, G, to which they belong, in order that some of the warp threads which

are guided by the filling guides 25, 26, (and all which threads belong to the open work,) may be transposed in such manner as to accompany those bobbin threads which have been previously forming twists around the said warp threads, although, by the traversing action, those bobbin threads are transposed in common with all the other bobbin threads; and also, subsequently, the same filling guides must be again racked differently from the main guides to which they belong, in order to re-transpose the warp threads of the open work which were transposed, and thus restore them to their proper and usual places in the general row of warp threads, and in order to introduce taping threads into the proper plain parts of the net, by the side of the stripes of honeycomb open work, so as to form stripes of taping, by way of bordering to that open work, two other extra guide bars K, and L, may be applied by the side of the guide bars 3, and 4, with guides M, and N, affixed to them opposite to all those places in the net where stripes of taping threads are to be interwoven therein.

Those taping threads are to be supplied by two small warp rollers M, and N, from which threads one to be conducted up outside of the two taping guide bars K, and L, and through their guides M, and N, the ends of which must stand just so much outside of the outermost filling guides, as to keep clear of them for racking.

The two taping guide bars K, L, may be racked by suitable racking wheels fixed on the upright axis of the ordinary racking wheels at O, and P, Plate IX. The taping guides N, at the back are applied at places in the net, exactly opposite to those where the front taping guides are applied; and by the operation of the machinery, the front taping threads *m*, will be inserted into every other alternate mesh at that part of the width of the net where they are applied, whilst the back taping threads N, will be inserted into the intermediate meshes, so that the back and front taping threads together will fill up as many adjacent meshes, side by side, as is required to form the intended longitudinal stripe or tape in the net; and where such taping threads are required to be interwoven into the midst of the honeycomb open work, in order to fill up and contract the small meshes thereof, and also to extend the larger meshes, as before mentioned, only every alternate mesh, side by side, is required to be so filled up, leaving the intermediate meshes, they being the enlarged meshes, wherefore the taping guides P, for that purpose are fixed on the same front taping bar K, which carries the taping guides at M, for forming an ordinary taping, as before mentioned; the said guides P, for taping the open work, being placed exactly opposite to the front filling guides, as is shown at fig. P, and no corresponding taping guides will be required to be opposite to the open work at the back thereof.

The point bars for taking up the meshes of the net which is making, according to this part of my improvements, will be required to be racked when the points are making their insertion between the bobbin threads. For that purpose two racking wheels, 15, and

6, are to be fixed upon the upper end of the upright axis for the ordinary racking wheels; see also the plan, fig. 4, and they will act by suitable racking levers 17, and 18, upon gage screws in the end pivots of the crank bars R, by which the point bars are suspended, so as to rack those bars endways; occasionally, one wheel 15, and lever 17, being for the front point bar, and the other for the back point bar. and springs 19, 20, are applied by the intervention of suitable cross levers 21, 22, to urge each of the point bars endways towards its own racking wheel; and note, it is the front points which in all cases take up theenlarged meshes of the honeycomb open work, the back points in all cases taking up the small meshes. The points act in that mode which is termed taking up all the twist, and not by that in mode which in Lever's machines is called hugging the twist; all the remaining parts of the machinery being understood to be on the usual construction; and the steps on the several racking wheels being, according to the figures,—the operation of the machinery, including my improvements, is as follows:—

The filling guides 25, 26, 27, and 28, and tapping guides *m*, *m*, and P, are to be threaded and interspaced amongst the main guides F, G, so as to hold their several threads in the manner shown by figure 1, Plate IX., when the parts are in the position which may be chosen for a commencement of the description; that is, when both divisions of carriages are behind the warp threads, and locked in the back combs, and the racking wheels have just racked number 1, but no motion has been since made.

The front points are in the act of taking up the meshes of the net, they having descended and penetrated between the warp threads only an instant before number 1 was racked, but have not yet entered between any of the threads proceeding from the bobbins, now stand racked to the left as far as they can go; viz. the two main guide bars *t*, *t*, together with the two filling guide bars 1, 2, and 3, 4, belonging to each of them; all these six guide bars are capable of racking one double tier space each. The front taping bar, K, stands racked in its middle position, from which it can be racked one space either way, the same being capable of racking two spaces. The back taping bar L, stands racked to the right as far as it can go. This position of the several parts being understood, the winch handle being turned will actuate the various parts with the following movements in succession; viz. the two locking cams in beginning to turn round will allow the lockers (both back and front) to turn their blades down inwards towards the guides, so as to liberate the carriages, and at the same time the main driving cams will cause the driving bars (both back and front together) to swing forwards, and in so doing, the back driving bar will drive the two divisions of carriages forwards in their back combs, and pass the front division of carriages through between the warp threads; also at the first commencement of the above motions, the front points which are inserted between the warp threads begin to go upwards between those threads, and are reached by their racking wheel 15, and its

lever 17, half a space to the left, before they penetrate the front bobbin threads; which threads, by the vibrating motion of the carriages, are advancing forwards towards the front points, so as to meet them as they are going up; and the front points having thus made their insertion correctly amongst the front bobbin threads, they are then allowed by their racking wheel 15, and lever 17, to rack one space to the right by the re-action of their spring 19, and its lever 21; and having done that, in continuing to rise up, they penetrate amongst the back bobbin threads which are advancing forwards and meeting the points; and having now secured all the threads, the front points go quite up, but are racked again by their wheel 15, half a space to the left before they get quite up: and note, in consequence of racking the front points as aforesaid one space to the right, after they have entered between the front bobbin threads, but before they make their insertion between the back bobbin threads, the adjacent bobbin threads of those two rows between which the points were so entered will become crossed over each other on the points in taking them up, that is, the front bobbin threads will become bended to the right across the back bobbin threads, which being afterwards bended to the left, will cause complete crosses of the bobbin threads to be taken up by the front points. By the time that the front points have got quite up, the front division of carriages will have been driven forwards so far, that the blade of the front locker, which then turns upwards, will put them quite through the warp threads into the front combs, whilst the back division of carriages will be locked up by the blade of the back locker in the back combs, and then the racking wheels rack No. 2, by which racks the front combs one space to the right, with the front division of carriages in them, and also racks the front guides one to the right, together with both their rows of filling guides, all three racking together like one undivided row. The lockers back and front then turn their blades down inwards towards the warp threads so as to release all the carriages, and the drawing bars swinging further forwards than they did last time, will drive the back division of carriages forwards between the warp threads, and the front locker turning its blade upwards, will pull them quite through into the front combs, and then the racking wheels rack No. 3, which racks the front combs one to the left, with all the carriages in them, and also racks the front taping threads one to the left; then the lockers turn their blades down, and the driving bars begin to swing backwards, so to drive back the carriages, and pass the back division between the warp threads, and then the lockers turn their blades upwards again, whereby the back one takes the back carriages quite through into the back combs, and the front one locks the front carriages in the front combs; and then the racking wheels rack No. 4, which racks the front combs one to the right with the front carriages in them, and racks the back guides one to the right, together with their two rows of filling guides, all three racking together like one row, and also racks the front taping

threads two to the right: then the lockers turn their blades down again, and the driving bars swing further back to pass the front carriages between the warp threads; and when the back locker has drawn them quite through into the back combs, the racking wheels rack No. 5, which racks the back guides one to the left, together with both its rows of filling guides, and also racks the front taping threads one to the left. The front carriages are then brought through forwards, and the back points are drawn out of the net and begin to go down, and they get about half way down by the time that the racking wheels rack No. 6, which racks the front guides one to the left, with its rows of filling guides, and also racks the back taping guides one to the left. Then the back carriages are brought through forwards, and the back points descend in order to penetrate the warp threads, as soon as the back carriages have come quite through between those threads; but an instant before they do so, the back points are racked by their own racking wheel 16, and lever 18, half a space to the left, and at the same time the back taping guides are nudged by their own racking wheel P, one space to the left, in order that the back points in penetrating the warp threads may take each back taping thread on the right hand side of that thread. The back points having made their insertion amongst the warp threads, but before they overtake or reach, the bobbin threads are racked by their own spring 20, and racking wheel 16, half a space to the right, and then they penetrate between the back bobbin threads about the time that the racking wheels rack No. 7, which rack the front guides one to the right, together with both its rows of filling guides, and also allows the back taping bar to return from its nudge before mentioned, so as to stand as it did after No. 6, was racked. The back carriages are then put through backwards, and the back points having already made their insertion between the back bobbin threads, rise up and are racked again by their wheel 16, and lever 18, half space to the left, before by rising they penetrate the front bobbin threads which are moving backwards, and meeting the back points, which latter having thus secured, all threads go quite up, but in so doing, their racking wheel 16, and lever 18, allows them to be racked back again half a space to the right, by their spring 20, and its lever 22, and the back points get quite up by the time the racking wheels rack No. 8, and note the racking of the back points, in making their insertion between the two rows of the bobbin threads, occasions crossings of the bobbin threads to be made by the back points, as before explained respecting the front points. The racking of No. 8, racks the back guides one to the right, together with both its rows of filling guides, and racks the front taping guides one to the right, and also racks the back taping guides one to the right: then the front carriages are then put through backwards, and No 9, is racked, which first brings the distinction between the main guides and their filling guides into action, for No. 9, racks the front guides F, one to the left, together with their outermost filling

guides 26, like one row, but leaves their outermost guides 25, standing, whereby the regularity of the front tier of warp threads in their previously unbroken row is deranged for the present, and No. 9, racks the back guides one to the left, together with both its rows of filling guides, and also racks the front taping guides one to the left. Then the front carriages are brought through forwards, and No. 10, is racked, which racks the front guides F, one to the right, together with their outermost filling guides 26, but racks their innermost filling guides 25 (which stood still last time), one to the left, being the contrary way to the simultaneous racking of the general row F, to which they belong, and No. 10, also racks the back taping guides one to the left. Then the back carriages are brought through forwards, and No. 11, is racked, which racks the innermost front filling guides 25, one to the right, but leaves the front guides F, standing still, together with their outermost filling guides 26, and also racks the back guides G, one to the right, together with their outermost filling guide 28, like one row, but leaves their innermost filling guides 27, standing still. Then the back carriages are put through backwards, and the front points are drawn out of the net, and begin to descend, but do not get more than half way down, when No. 12, is racked, which racks the back guides G, one to the left, together with their outermost filling guides 28, like one row, but racks their innermost filling guides 27, one to the right, being the contrary way to the simultaneous racking of the general row G, to which they belong, and racks the front taping guides one to the left, and also racks the back taping guides one to the right. Then the front carriages are put through backwards, and the front points go quite down, ready to enter between the warp threads as soon as the front carriages have passed quite through between the threads, but an instant before they do so, the innermost back filling guides 27, are racked prematurely, one to the left, and then the front points penetrate the warp threads, and then the racking wheels rack No. 1, which racks the front combs one to the left, without any carriages in them, and racks the front guides one to the left, together with both its rows of filling guides, and racks the front taping, guides one to the left; and now the ordinary racking wheels having gone quite round, all the parts have regained the same positions which they occupied at the commencement of this description, excepting that the large racking wheels 5, 6, and 7, 8, for the filling guide bars have gone only half round. The continuance of the operation is precisely a repetition of that which has been above described, during all the motions which take place, whilst No. 2, No. 3, No. 4, No. 5, No. 6, No. 7, and No. 8, are racked without any alteration, until the repetition of racking No. 9, which is numbered 21, from the commencement; and then when the front guides F, are racked one to the left, it is their innermost filling guides 25, which accompany them, like one row, and their outermost filling guides 26, which stand still. And at the repetition of No. 10, (which is No. 22,) when the front

guides F. are racked one to the right, it is their innermost filling guides 26, which accompany them like one row, and their outermost filling guides 27, which are racked one to the left, contrary ways. And at the repetition of No. 11, (which is No. 23,) it is the outermost front filling guides 26, which are racked one to the right, whilst the front guides F, stands still, and also when the back guides G, are racked one to the right; it is their innermost filling guides 27, which accompany them, and their outermost filling guides 28, which stand still, and at the repetition of No. 12; (which is No. 24,) when the back guides G, are racked one to the left, it is their innermost filling guides 27, which accompany them, and their outermost filling guides 28, which are racked one to the right contrary ways. And lastly, at the repetition of No. 1, it is the outermost back filling guides 28, which are racked one to the left, before the front points penetrate between the warp threads. The large racking wheels, 5, 6, and 7, 8, have now gone quite round, and all the parts have regained the position which they occupied at the commencement. Two rows of complete meshes of bobbin net will have been formed by the movements above described, but the meshes which were taken up by the front points will be of an enlarged size, at all those places in the width of the net where the main guides F, G, for the warp threads have been cut out of their respective rows, and filling guides 25, 26, 27, and 28, have been applied to fill up the vacancies so formed, according to my improvements, as hereinbefore described.

Note, that mode of introducing taping threads by guides *m*, and *n*, for the mere purpose of making stripes of taping in the net, is no part of my invention; but it is part of my invention to use those same means as hereinbefore described in combination with my improvement, for the purpose of introducing such taping threads by guides P, into the midst of the honeycomb open work, whilst the same is making by machines which traverse their carriages, those threads being introduced into the smaller meshes of the open work. And note, the machine hereinbefore described and represented in Plate IX., may be worked according to my improvements, as hereinbefore described, in conjunction with the means commonly used for making bobbin net, in narrow breadths by like machines, viz. with the back driving bar I, sheet I, formed of a broad blade or plate *i*, *i*, with slits cut in it, opposite to all the joinings of the selvedges, for the several breadths of net, and with slider *l*, fixed to a bar *k*, in order to cover and close those slits, or by a lateral motion to open them occasionally when it is requisite to leave particular carriages of the back division B, isolated by themselves; which carriages are those which supply the whipping or lacing threads.

And in case of making breadths, extra guides, called selvedge guides, *r*, *r*, will also be required for guiding the selvedge threads of the several breadths, which threads should be supplied from small thread rollers of their own.—[Here follows a long description of the manner in which such selvedge guides are usually worked.]

The specification then proceeds:—The mode of arranging the parts in a suitable manner, for double bladed locker machines, is represented in fig. 5, Plate IX., and the same letters and figures of reference are used therein, to denote the same parts which have been hereinbefore described; and in like manner my improvements may be applied to those circular comb double-tier rotary machines, which are called fluted roller machines.

The mode of applying my improvements to fluted roller machinery will be very similar to that hereinbefore described; but in order to obtain sufficient room for the introduction of my filling guides, and of the taping guides between the two innermost fluted rollers and the guide bars, the carriages should be made rather longer, and with more teeth at the underside than is most commonly used, in order that the fluted roller may stand further asunder. A suitable arrangement for the operative parts of such a fluted roller machine is represented by the section in fig. 6, which explains the manner of introducing the requisite filling guides, and the taping guides of such are used for the purpose of making honeycomb open work on pieces of bobbin net, according to my improvements, and the same letters and figures being used to denote the same parts as in fig. 1; the foregoing description will be a sufficient explanation:—All other parts of the fluted roller machine y which are not represented in the section, fig. 6, may be constructed in their usual manner, with the addition of suitable racking wheels, such as 5 6, and 7, 8, figs 2, 7, and 8, for racking the filling guide bars 1, 2, 3, 4, and for the taping bars K, L, if such are used. The large cog wheels 10, for those racking wheels must be suitably proportioned to its driving pinion X, for turning them once round, whilst two rows of complete meshes of net are made by the machinery; the ordinary racking wheels which turn round once in working one row of complete meshes should be made with suitable steps for operating on the various bars, according to the foregoing description, which, together with the representation of these wheels in the figures, will be a sufficient explanation to persons conversant with fluted roller machinery for applying my improvements thereto; and respecting the application of my improvements to what is called Lever's machinery, which are termed single-tier machines, because all the bobbin carriages are arranged in one row, side by side, and the warp threads are also in one unbroken row, and the carriages are all passed between the bobbin threads together at once, instead of arranging the warp threads and the carriages in two rows, as in double tier machinery; fig. 9, is a section of the operative parts of a Lever's machine with my improvements applied thereto, for making ornamental net, either in pieces or in breadths, containing stripes of honeycomb open work. The mode of applying my filling guides being very similar to that before described, a less minute explanation is required.

[Here is a long statement of reasons and objections which we dont think it necessary to repeat.]

The section fig. 9, represents the relative position of all the bars: the bobbins and carriages are as usual. The main guide bar and front comb bar are racked by their usual racking wheels on the upright axis, at the right hand end of the machine; and s s are the two selvedge bars, and the turnagain comb bar, all as usual in Lever's machines. The two taping bars are to be racked by two additional racking wheels fixed in the same upright axis as the other usual racking wheels. But the four filling guide bars are to be racked by four extra racking wheels of about double the usual size, which may be applied on an upright axis of their own, at the left hand end of the machine, with a ratchet wheel of sixteen teeth fixed upon it, and which is turned round by a suitable clawker or chopper, deriving its motion from the swing out of the landing bars in the same manner as the usual chopper, which acts on the eight-toothed ratchet wheel of the ordinary racking wheels, wherefore the large ratchet wheel will be racked one tooth every time that the ordinary ratchet wheel is racked one tooth; the racking of both being simultaneous, by which means the large ratchet wheel, and its four extra racking wheels, will be turned once round, whilst two rows of complete meshes are worked.

The mode of applying such extra racking wheels at the left hand end of the Lever's machine, may be seen in fig. 10, Plate IX., where 10, is the large ratchet wheel of sixteen teeth, and 9, is the upright axis upon which it is mounted, that axis being supported by bearing brackets affixed to the wood frame, and reaching out therefrom. The four large racking wheels for racking the filling guide bars are fixed on the axis 9; one of them is shown at 31, with a sliding bolt 39, by which its racking motions might be transmitted to one of the filling guide bars; and there are also three others such racking wheels and sliding bolts which are not represented, but they would be situated one above the other on the axis 9: 23, is the clawker or driver for turning the ratchet wheel 10; it is jointed to one arm of an elbow lever 24, which serves the place of a chopper: it plays on an upright centre, fixed in on a bracket projecting out from the wood frame, and the other arm of the lever 24, acted upon by a projection *w*, affixed to one of those links which are called goose necks, and which is jointed to the front landing bar, and reaches downwards and backwards beneath the fixed tie bar, to be jointed to the lever end of the usual drawing tickle levers at the back of the machine. By this means, when the front landing bars are extended, the elbow lever 24 is moved by the projection *w*, on the goose neck, and thereby the driver 23, is made to turn the racket wheel 10, one tooth, and there is a re-acting spring to pull back the lever 24, when the projection *w*, retreats as the landing bars are closed in order that the driver 23, may proceed to catch another tooth of the ratchet wheel 10.

The main guides F, which are cast in leads just as usual in Lever's machine, are to have guides cut out of their row in the manner shown by the separate figure F, at all those places

where stripes of honeycomb open work are to be made in the net, twice as many guides being cut out at each such place as the number of enlarged meshes which are required to be made in that part of the open work, counting across the width of the net and the warp threads, which would in the usual way of working Lever's machines have been threaded through the guides which are so cut out, are to be threaded through the filling guides 25, 26, 27, and 28, with one-fourth of the number of those warp threads in each row of those filling guides. The filling guides 25, 26, 27, and 28, which will be the same as those hereinbefore described, may be soldered into stems of brass plate, which are fixed at their lower ends by screws to the filling guide bars 1, 2, 3, and 4, and those stems are bended, so that the guides at their upper ends will stand properly interspaced to the main guides, in order that the main guides and filling guides together may hold the warp threads in their intended spaces, so as to form one regular unbroken row of warp threads for the bobbin carriages to pass through in the usual manner of Lever's machines.

The four filling guide bars are for the most part racked coincidently and simultaneously with the main guide bar, so as to accompany the same in its racking motions, as though all the five bars were one, carrying a regularly spaced unbroken row of warp threads; but occasionally, at particular periods of the operation of the Lever's machinery, the racking motions of some of the filling guides are different from the racking motion which the main guide bar is at the same instant performing, and the four filling bars go in pairs for so racking differently from the main guide bars, for when one pair are racking differently, the other pair are racking coincidently, so as to accompany the main guide bar; and it is one of those pairs which, at suitable periods, so rack differently during the making of one row of complete meshes of net, and the other pair which rack differently at like periods during the making of the next succeeding row of complete meshes of net. Hence there is a relation of lateral position between the filling guides and the main guides, which may be called their ordinary collocation, to which the filling guides are always restored, after having been racked differently from the main guides. The filling guides 25, which are carried by the uppermost front filling guide bar 1, are to be so interspaced to each of the vacancies, in the row of main guides F, that when the bar 1, stands racked, one single-tier space to be left of its said ordinary collocation in respect to the main guide bars, then the left-handmost filling guides 25, will stand in true continuation of the row of main guides at that edge of the vacancy in them. The filling guides 26, which are carried by the uppermost back filling bar 2, will stand in true continuation of the aforesaid guides 25, counting from left to right, when the bar 2 stands racked one space to the right of its ordinary collocation, in respect to the main guide bar. The filling guides 27, which are carried by the lowermost front filling bar 3, will stand

in true continuation of the aforesaid guides 26, when the bar 3, stands racked in its ordinary collocation in respect to the main guide bar; and the filling guides 28, which are carried by the lowermost filling bar 4, will stand in true continuation of the aforesaid guides 27, when the bar 4, stands racked in its ordinary collocation in respect to the main guide bar.

These particulars respecting the mode of threading the several guides being understood, the manner of working the machinery therewith is as follows:—Note, The point bars for taking up the meshes of the net are just as usual in Lever's machinery, but the front points will always take up enlarged meshes of the net at all parts of the width of the net where the honeycomb open work is making, and the back points will always take up the small meshes thereof. The points act on the threads in taking up the meshes in Lever's machines by the mode which is termed hugging the twist. The warp threads are all conducted from the usual warp roller, and through the slea, to the main guides F, and of their filling guides 25, 26, 27, and 28, passing up behind the fixed tie bar, and the extra guide bars which are applied at the back of it. And note, if tapings are required to be inserted into the net, at parts where the meshes thereof are of the ordinary size, the front taping guides *m*, are applied opposite to every place in the width of the net where stripes of taping are required to be found therein. The other back taping guides *n*, are interspaced between the front ones *m*. The taping threads for both rows of guides are conducted up from a small roller M, fig. 10, Plate X., in front of the tie bar.

And note, if the selvedge guides, and the turnagain combs are used for making breadths, in conjunction with my improvements, their operation will be exactly the same as usual in Lever's machines when making breadths, and, therefore, need not be described.

Taking for a commencement of the description that period in the ordinary operation of Lever's machine, when the carriages have arrived in one unbroken row at their central position between the warp threads, being in progress of vibrating, and going through between those threads from the front combs to the back combs, and ready for dividing the carriages into two rows, and for taking up the meshes of the net with the back points, the front catch bar being lifted up out of the front notches of the carriages, and the back catch bar being down in the back notches thereof; also the landing bars being separated a little, that is, as far as their back dividing stop will allow.

The main guide bar *t*, stands racked to the left all but one space. It is capable of moving three spaces in all, that is one to the left, or two to the right of its present position. The filling guide bar 1, with its guides 25, stands racked to the left all but one space. It is capable of moving three spaces in all, that is one to the left, or two to the right of its present position. The filling guide bar 2, with its guides 26, stands racked in its middle position: it is ca-

pable of racking four spaces, that is, three spaces to the right, or one to the left, from its present position. The filling guide bar 3, with its guides 27, stands racked in a middle position, from which it can go one space to the left, or two to the right.

Note, this bar is now in its ordinary collocation in respect to the main guide bar: and the filling guide bar 4, with its guides 28, stands racked all but one to the left, from which position it can go two spaces to the right, or one to the left; this bar is also in its ordinary state of collocation in respect to the main guides. The four filling guide bars being in those positions, will hold the warp threads as already explained, respecting the filling guides; those pairs of warp threads belonging to the honeycomb open work which are now held in adjacent spaces by the guides 25, and 26, of the guide bars 1, and 2, stand transposed by virtue of my improvements, each one being at that place in the general row of warp threads, which belongs to its neighbouring warp threads of the same pair, but the intermediate pairs of warp threads which are held in adjacent spaces by the guides 27, and 28, of the guide bars 3, and 4, now occupy their own proper places in the general row of warp threads, the same as they would do for making ordinary bobbin net.

And note, the meshes which will be included between the said pairs of warp threads of the filling guides 25, and 26, which stand transposed as aforesaid, will be enlarged meshes of the honeycomb open work. The front taping guide bar K, stands racked to the left all but one space, but it is capable of moving three spaces in all, that is one to the left, or two to the right of its present position. The back taping guide bar L, stands racked to the right all but two spaces, it is capable of racking three spaces.

Note, the proper forms for the steps around the circumference of all the racking wheels shown in Plate X., where the numbers or letters of their corresponding guides are marked on them. The directions for working are as follows:—Take up the meshes with the back points, by pressing down the left treadle: the back catch bar will then be lifted out of the back notches of the carriages as the points go down, and the back pushers will be brought into action so as to divide the single row of carriages into two rows or divisions, which being done, and the points having got quite down and penetrated amongst the threads, they cause the front catch bar wheel to be nudged round, so much as to let fall the front catch bar into the notches of the front division of the recently divided carriages, whereby those carriages are secured in their divided state. Then by releasing the left treadle, the back points go up again, carrying up the twists and crossings before them; and they let the back catch bar down as they go up, and when they get quite up, they cause the ratchet wheel of the back stop to be nudged round so much as to release that stop.

Extend the landing bars by raising the handles to bring the front division of carriages through from between the warp

threads into the front combs, and take the back division of carriages through into the back combs, and then the usual chopper turns the eight-toothed ratchet wheel for the ordinary racking wheels to tooth 1. Also the corresponding chopper or driver 23, of the additional sixteen-toothed ratchet wheel 10, at the same instant turns that wheel to tooth 1, by which means the front combs are racked two spaces to the right, with the front carriages in them. The main guides F, are also racked two spaces to the right. The filling guides 26, are racked three spaces to the right, which being one space more than the main guides have been racked that way, the said filling guides 26, are thereby restored to their ordinary collocation in respect to the main guides. The filling guides 25, 27, and 28, are all racked together two spaces to the right, so as to accompany the main guides. The front taping guides *m*, are racked two spaces to the right, so as to accompany the main guides; the back taping guides N, are racked two spaces to the right Put the divided carriages down to their central position, in order to re-arrange them all in one row, wherein those which formed the front division will have traversed to the right; when the carriages get nearly into one row, both catch bars are lifted up, and then the back catch bar falling, secures the entire row; and by extending the bars again, all the carriages will be taken through between the warp threads into the back combs, and the ratchet wheels will rack tooth 2, which racks the front combs two spaces to the left, without any carriages in them, and racks the main guides F, two spaces to the left, and racks the filling guides 25, also two spaces to the left, to accompany the main guides and racks. The filling guides 25, three spaces to the left, which being one space more than the main guides, have been racked that way; the said filling guides are thereby restored to their ordinary collocation in respect to the main guides and racks. The filling guides 27, two spaces to the left, and racks the filling guides 28, two spaces to the left; so that both the last mentioned rows of guides accompany the main guides and racks the front taping guides *m*, one space to the left, and racks the back taping guides three spaces to the left. Bring the carriages forward to their central position, the back catch bar is lifted, and the front one let fall, and by extending the bars again all the carriages are brought through into the front combs, and tooth 3 is racked, which racks the main guides F, one space to the right; and all the four rows of filling guides 25, 26, 27, and 28, one space to the right coincidently with the main guides, and racks the front taping guides *m*, one space to the right, and racks the back taping guides *n*, one space to the right. Push the carriages backwards to their central position, the back catch bar is let fall, and the front one lifted, and by extending the bars again all the carriages are taken through into the back combs; and tooth 4 is racked, which racks the main guides one space to the left, and racks all the four filling guide bars one space to the left, coinci-

dently with the main guides, and racks the front taping guides *m*, two spaces to the left, and the back taping guides N, are not racked. Also when tooth 4, is racked, the back dividing stop is set ready for catching. Bring the carriages forwards to their central position, the catch bars are not altered, but the dividing stop catches and detains the landing bar. Take up the meshes with the front points by pressing down the right treadle, the back catch bar will be lifted as they descend, and the pushers will be brought into action to divide the single row of carriages into two divisions; when the points have got down and penetrated between the threads, the front catch bar wheel is nudged, so as to let the front catch bar fall, in order to secure the front division of the recently divided carriages; and as the front points go up, they let down the back catch bar, and it secures the back division; and when the points get quite up, they nudge the wheel of the back dividing stop, so as to release that stop. Extend the bars to bring the front division of carriages into the front combs, and to take the back division into the back combs, and when both get quite clear of the warp threads, tooth 5, is racked, which racks the front combs two spaces to the right, with the front carriages; the main guides F, are not racked, nor the filling guides 26, and 27; but the filling guides 25, are racked two spaces to the right, which removes them thus much from their ordinary collocation in respect to the main guides. The filling guides 28, are not racked. The front taping guides *m*, are racked two spaces to the right, and the back taping guides *n*, are racked two spaces to the right. Put the divided carriages down to their central position, in order to re-arrange them all in one row, wherein those which formed the front division will have traversed to the right. When the carriages get nearly into one row, both catch bars are lifted, and then the front catch bar falling, secures the entire row; and by extending the bars again all the carriages will be drawn forwards into the front combs, and tooth 6, is racked, which racks the front combs two spaces to the left, with all the carriages. The main guides are not racked.

The filling guides 27, and 28, are not racked; but the filling guides 25, and 26, are racked one space to the left; by which means the pairs of adjacent warp threads of the open work which are threaded into their guides become transposed, each one into that place into the general row of warp threads which belongs to its neighbouring warp threads of the same pair. The front taping threads *m*, are racked two spaces to the left, and the back taping threads *n*, two spaces to the left. Push the carriages backwards to their central position, the back catch bar is let fall, and the front one lifted, and then by extending the bars all the carriages are taken through into the back combs, and tooth 7, is racked, which racks the main guide F, one space to the left, together with all the four rows of filling guides 25, 26, 27, and 28, which accompany the main guides one space to the left, and racks the front taping threads *m*, one space to the left, and the back taping guides *n*, one

space to the left. Bring the carriages forwards to their central position, the front catch bar is let fall, and the back one raised; and then by extending the bars all the carriages are brought through into the front; and tooth 8, is racked, which racks the main guides one space to the right, together with all the four rows of filling guides, 25, 26, 27, and 28, which accompany the main guides one space to the right, and racks the front taping threads *m*, one space to the right, and the back taping guides *n*, one space to the right; also the back dividing stop is set ready for catching. Push the carriages backwards to their central position, the back catch bar is let fall and the front one raised, and the dividing stop catches and detains the landing bars. The ordinary racking wheels have now gone once round, and a row of complete meshes of net has been worked. All the parts have now regained the same positions which they had at the commencement of this description, excepting the large racking wheels, which have gone only half round, and the filling guide bars which are racked by those wheels stand differently to their position at the commencement; for it is the filling guides 25, and 26, which are now in the ordinary collocation in respect to the main guides, and the other two rows of filling guides, 27, and 28, which hold their warp threads transposed. The continuance of the operation is an exact repetition of that which has been described, except the racking of the filling guide bars, which varies therefrom as follows:—On racking tooth 9, of the large ratchet wheel (which is the repetition of tooth 1, of the ordinary racking wheels), it is the filling guides 28, which are racked three spaces to the right, when the main guides are only racked two spaces that way, and all the other three rows of filling guides 25, 26, and 27, accompany the main guides. On racking tooth 10, (which is a repetition of tooth 2,) it is the filling guides 27, which are racked three spaces to the left, when the main guides are racked only two spaces that way; and all the other three rows of filling guides 25, 26, and 28, accompany the main guides. The racking of tooth 11, (which is a repetition of tooth 3,) is exactly the same as formerly; and so is the racking of tooth 12, (which is a repetition of tooth 4). On racking tooth 13, (which is a repetition of tooth 5,) it is the filling guides 25, which are racked two spaces to the right, whilst the main guides are not racked at all. On racking tooth 6, (which is a repetition of tooth 14), it is the filling guides 25, and 26, which are racked both together one space to the left, when the main guides are not racked at all. The racking of tooth 15, (which is a repetition of tooth 7,) is precisely the same as formerly, and so is the racking of tooth 16, (which is a repetition of tooth 8). The large ratchet wheel having now gone once round, and two rows of complete meshes of net having been worked, all the parts, without exception, will have regained the positions which they had at the commencement of the description. The meshes which the front points have taken up will be of an enlarged size at all those places in the width of the net, when the main

guides F. for the warp threads have been cut out of their respective rows of filling guides 25, 26, 27, and 28, have been applied according to my improvements, to fill up the vacancies. The operation of the Lever's machine, as above described, will intervene the taping the threads, which are supplied according to the mode usually practised by the guides *m*, and *n*, into the plain part of the net where its meshes are of the usual size, so as to produce stripes of ordinary taping, by the side of the stripes of the open work, but such tapings form no part of my invention: and taping threads may also (or may be otherwise) introduced into the midst of the open work, to pass through and fill up the small meshes as hereinbefore explained, such threads being supplied by taping guides P, fixed to the front bar K, so as to stand opposite to the intervals between the enlarged meshes of open work into which such taping threads are intended to be interwoven, such interweaving is part of my invention; and the racking movements hereinbefore described, will cause those taping threads to be properly inserted into the small meshes of the open work, but no back taping guides *n*, will be required to be applied opposite to the open work. My improvements may be carried into effect by operating upon the warp threads which belong to the open work, (in a suitable manner for transposing those pairs of such threads which are from time to time intended to include the enlarged meshes between them,) without the four rows of filling guides hereinbefore described, by substituting the apparatus which is represented in figs. 10, 11, and 12, as applied to a Lever's machine. The leads of the main guides are screwed in a row to the main guide bar as usual, and instead of cutting out the guides from that row, as hereinbefore directed, at all places where stripes of honeycomb open work are intended to be made in the net, every alternate guide at those places is to be bended a little forwards before the general row, and the intermediate guides are to be bended backwards a little behind that general row, in order that the said bender guides may hold the warp threads belonging to the open work in two tiers or divisions, F, and G, fig. 13, whereof the front tier F, consists of all those warp threads, which in the former mode would be threaded through the eyes of the two rows of filling guides 26, and 27; and the back tier G, consists of all those warp threads which would be threaded through the eyes of the other two rows of filling guides 25, and 28, the said threads which are thus divided into two tiers can be bended aside from their own proper places in the general row of warp threads, by occasionally inserting stump guides or prongs without eyes between the said warp threads, a little above the eyes of their own guides F; and by racking those stump guides either to the right or to the left, they will bend the threads between which they are inserted, so as to rack or carry them sideways from one space to the next.

The warp threads being thus divided into two tiers, the prongs of the said stump guides (which I call benders) can be inserted between

the warp threads of one tier F, so as to be capable of bending and racking them sideways, without entering so far through between the threads of that tier so as to rack the warp threads of the other tier G, which will not, therefore, be bended or racked: and by suitable application of such benders, by inserting them at appropriate periods of the operation of the machinery between one pair of warp threads, or between both tiers, and then racking the said benders with suitable racking motions, so as to bend one or both of the said tiers sideways to the right or to the left, as may be required, I can produce all that effect hereinbefore explained of transposing adjacent pairs of warp threads belonging to the open work each one into the place belonging to its neighbouring warp threads of the same pair, for the purpose of causing the warp threads which are so transposed to accompany those bobbin threads which have previously been forming twists around them in that transposition which the said bobbin threads undergo by traversing, in order that the said bobbin threads which are so transposed may go on twisting around the same warp threads (which, by virtue of my improvements, have also been transposed), and thereby prolonged the said twists as much as is requisite for forming meshes of an enlarged size at particular places in the net which is making. Instead of bending the ordinary main guides of Lever's machinery to arrange the warp threads in two tiers, as aforesaid, it is better to have guides of two sorts interspaced one between the other in the same leads, one sort, (shown separately at F, fig. 13,) which is for the front tier, having the eyes advanced more forward than the other sort, G, which is for the back tier, having the eyes further back. The benders 30, are short prongs, soldered into a stem of brass in the manner of extra guides, the extremities of the prongs being turned nearly into a horizontal direction when the brass stem is inclined conformably with the inclination of the comb bars, as shown in the section, fig. 12. Each intended stripe of open work will require the benders 30, for it to have half as many prongs as the number of enlarged meshes which are to be made side by side across the width of the stripe; and the thickness of the prongs 30, must be sufficient to exactly fill up the space between two adjacent warp threads, in order that when the prongs are inserted between two such threads, each one may be retained at the exact place in the general row of warp threads, to suit the gates of the combs. The brass stems of the benders 30, are screwed to a bar 31, situated beneath the under edge of the front comb bar in place of the front taping guide bar K; but the bender bar 31, is mounted upon the fixed centre pins 32, supported at the underside of the fixed t e bar, (see figs. 11, and 12,) having curved arms 33, affixed to it, to reach down to those centre pins upon which the lower ends of the arms 31, are jointed, much in the same manner as pusher bars are mounted upon the centres of motion by which they are connected to their landing bars. The bender bar 31, and its benders 30, being moveable about the fixed centre pins 32, their prongs 30, can be inserted between both tiers F, G, of the warp

threads, as shown in the section, fig. 12, or can be withdrawn so much as to quit the threads of the back tier G, still remaining inserted between the threads of the front tier G; or the prongs 30, can be withdrawn altogether from between both tiers of the threads F, G. The bar 31, of the benders can also be racked endways, which being done whilst its benders are withdrawn from between the warp threads, they will, when reinserted, enter between different pairs of adjacent warp threads to those between which they were inserted at the former time; or the benders, being racked whilst the prongs are inserted between the front tier F, of warp threads, will bend and rack those threads without interfering with any others; or the benders 30, being racked when they are inserted between both tiers F, and G, will bend and rack the threads of both tiers.

The requisite motions are given to the benders for these purposes by two large racking wheels 34, and 35, fixed on the upright axis 9, before mentioned, in place of the four racking wheels for the filling guide bars represented in Plate X.; and the manner of racking those wheels by a chopper and sixteen-toothed ratchet wheel 10, has been explained. The steps around the racking wheel 35, causes the benders to penetrate between the warp threads, that action being transmitted by a racking lever 36, which is poised on an upright centre pin fixed in a bracket which projects out from the wood frame. One end of the lever 36, applies with a tooth to the circumference of racking wheel 35, and the other applies to the lower end of a prolongation 37, of one of the curved arms 33, of the bender bar 31, which prolongation descends downwards therefrom below the centre pins 32: and elastic springs 38, are applied to re-act against the racking wheel, and urge the benders always backwards towards the threads, so as to penetrate between them whenever a depression or notch of the racking wheel 35, comes round to the tooth at the end of the lever 36. The other racking wheel 34, gives the requisite racking motions to rack the bender bar 31, endways in the direction of its length; those motions being transmitted by a sliding bolt 39, with a gage screw to act against the flat end of the bar 31; and an elastic spring 40, is applied to pull the bar 31, and re-act against its racking wheel 34. And in order to explain the succession of motions by which the benders produce the same effect in transposing the warp threads, as before described, respecting the four filling guide bars, it is not necessary to repeat the whole description of the operation, the forms of the steps for the racking wheels 34, and 35, being represented in Plate X., will convey almost all the requisite information.

At the period chosen for the commencement of the former description, which was just before taking up with the back points and dividing the carriages, the racking wheels having just racked tooth 16, the prongs of the benders 30, stand inserted between both tiers of warp threads F, and G, as shown in fig. 12, being in the geats or spaces between every other alternate pair of warp threads belonging to each stripe of open work, beginning with the first of

those pairs at the left-handmost edge of each stripe, and the benders holding the two threads of each of those pairs transposed into the place belonging to its fellow thread; and those pairs are about to have enlarged meshes formed between them, that is to say, that warp thread of the front tier, which really is the left-handmost thread of each such pair when it is in its proper place in the warp, now stands bended into the adjacent space on its right hand, and *vice versa*, that warp thread of the back tier, which really is the right-handmost thread of each pair, stands bended into the adjacent space on its left hand. This being understood to be their situation at the commencement, the successive actions of the benders are as follows: when tooth 1, is racked, the benders 30, are racked by their racking wheel 34, coincidently with the main guide bar, two single tier spaces to the right, and are at the same time drawn forwards by their other wheel 35, so as to quit the back tier G, of threads; whereupon those which were bended aside to the left (as before stated), by their own tension, to the right into their own proper places as right-handmost threads of each pair, still leaving their fellow threads of the same pairs bended to the right, wherefore the two threads of each such pair come together into the same gate. When tooth 2, is racked, the benders are withdrawn from the front tier of threads F, and then the last-mentioned threads (which remained bended) spring to the left into their proper place, so that all the warp threads become straight and regular in the main guides, just as usual in Lever's machines. The operation continues without any action of my improvements, whilst tooth 3, and tooth 4, are racked, except that immediately after tooth 4, is racked, the benders are put back, and inserted between the front tier of warp threads, but without bending or acting thereon, being only in preparation. But note, they are not now between the same pairs of threads that they were between last time, but are between the next adjacent pairs; and when tooth 5, is racked, the main guides stand still, but the benders are racked two spaces to the right, and bend their front tier warp threads which are on their right two spaces to the right away from their own proper places, so as to put them in the same gate with the next threads of the front tier: and after thus bending the threads, the benders are immediately put back, and inserted amongst the threads of the back tier; and when tooth 6, is racked, the main guides stand still again, but the benders rack 1, to the left, whereby they bend the threads of the back tier one space to the left, and allow those fellow threads of the front tier, which they bended two spaces last time, to return one of the two spaces, whereby a complete transposition of each pair of the said bended threads is effected; that thread of each pair which belongs to the left hand gate of the pair, is now held at the right hand gate thereof, and *vice versa*, and the benders continue to hold the said threads so transposed, whilst tooth 7, and tooth 8, are racked; and the benders are racked at both these times, with exactly the same motions as the main guides. The parts have now regained the

position which they had at the commencement, except that the pairs of the back and front tier threads which the benders now hold transposed, are not the same pairs which they held transposed at the commencement, but are the next adjacent pairs thereto, reckoning from left to right. The continuance of the operation whilst teeth 9, to 16, are racked, is an exact repetition of the preceding, excepting that when tooth 11, is racked, the benders are racked three spaces to the left, instead of only one space, as they did at the commencing racking of tooth 3; but as the benders are at both these times wholly withdrawn from the threads, that difference in the repetition has no effect on the threads, but it occasions the benders when they are reinserted between the threads (which is done after racking to. th 12,) to enter between the next adjacent pairs of front and back tier threads, to those pairs which they held transposed when tooth 8, was racked, and the pairs between which they are there inserted, are the same identical threads between which they stood inserted at the commencement of the description; wherefore, after tooth 16, is racked, all the parts, without exception, will stand in the same position as they did at the commencement. In case that taping threads are to be introduced into the midst of the open work, through the small meshes thereof, as hereinbefore described, the taping guides P, for that purpose, are to be fixed on the taping guide bar K, fig. 12, which is applied upon the top edge of the fixed tie bar; but those taping guides must be constructed so that they will not be interfered with by the action of the benders 30, although those benders must pass between the said taping threads. For this purpose, all the said taping threads which are to be worked into the same stripe of open work, must be all threaded through one taping guide, which has several eyes side by side, as shown by the separate figure P. The stem of that guide being quite at one end of it, so that the upper part of the same guide, when the eyes are formed, will reach out horizontally over the prongs of the benders, so that the same can be inserted amongst the warp threads, or be withdrawn therefrom without any interference therewith. Wherefore, although the prongs of the benders 30, may bend the said taping threads aside at the same time that they bend the warp threads, nevertheless, such bending being below the eyes of the taping guides P, will not have any effect upon the racking motions of the taping threads, but the same will obey the racking motions of the taping guide bar K, which racking motions are to be the same as those of the front taping bar K, already described by a racking wheel, which is delineated at m^*, fig. 10; and in case stripes of tapings of the ordinary kind are intended to be introduced into the plain part of the net by the side of the stripes of open work, the taping threads for that purpose must be introduced in the usual manner of taping by guides fixed to the same bar K, opposite to the intended places in the net as before explained; and the other intermediate taping threads, to fill up and complete such stripes of tapings, must be introduced by the like guides, affixed to another

bar L, situated in front of the fixed tie bar, and which taping bar L, will be racked in the manner of the back taping bar L, already described. The racking wheel for that purpose, is delineated at n*. Plate X.; and when honeycomb open work is to be made, according to my improvements, without introducing any taping threads into the same, the regular action of the taking up points will tend to equalise the size of the enlarged meshes to the size of the ordinary meshes of the plain net: wherefore, in order to counteract that tendency, and give full effect to the enlarged meshes, a row of thick points may be applied a little above the ordinary row of front points, so as to enter into the net at about two or three rows of holes above the front points: and the said thick points must be withdrawn after they have been forced in, and performed their office of enlarging the meshes, in order to permit the net to be drawn upwards by the turning of the lace roller, and the taking up action of the points, which being done, the thick points are to be forced in again into a succeeding row of meshes, being previously racked as much as is necessary to enter into the same. The apparatus for this purpose is represented in figs. 10, 11, and 12, but it is equally applicable to other kinds of machinery which is worked according to my improvements: 41, are the enlarging points; they may be cast in leads, or soldered into stems of brass (see 41); such points fixed by screws to the enlarging point bar 42, opposite to every place in the width of the net where honeycomb open work is to be made without taping threads. The bar 42, is situated over the front point bar, so as to keep quite clear thereof, when it is brought forward in order to withdraw its enlarging points from the net. The bar 42, is suspended by upright arms 44, from a horizontal axis or spindle bar 43, the arms 44, being firmly fixed to both, to unite them like one frame. The axis 43, is supported upon axles at each end of it in bearing sockets 54, which project out from the fixed top bar of the framing of the machine, and also with a middle bearing for the axis. The bar 42, is moveable about the axis 43, in order to insert or withdraw the enlarging points 41, from the lace; and the axis is capable of shogging endways on its pivots, in order to rack the bar 42.

The ordinary centre bar or lace bar must be raised a little to admit the extremities of the enlarging points to pass close beneath the edge of the centre bar when they penetrate through the net; and another lace bar may be fixed in front of the ordinary lace bar, leaving a narrow crevice between the two, for the lace to pass through, and to prevent it from yielding either way to the action of the enlarging points which must apply close under both of those lace bars. To force the enlarging points into the net, a long lever arm 45, is fixed to the spindle bar 42, near the middle of its length, and curves backwards to reach over the spindle bars for the point bars; and the lower end of the lever arm 45, applies to the indented circumference of a wheel 46, which is mounted on a short axis sup-

ported in bearings affixed to the back standard of the framing; and a ratchet wheel 48, of eight teeth, which is fixed on the same axis, is turned round a tooth at a time by a clawker 47, which is jointed to a short arm projecting out from behind the axis of the back levers of the drawing tackle, so as to turn the wheel 48, one tooth every time that the handles and landing bars are raised or extended: wherefore the wheels 46, will be turned once round in the time whilst a row of complete meshes of net are worked; and in the circumference of the wheel 46, is indented, so as to alternately raise and lower the end of the lower arm 45, and thereby urge the bar 42, with its enlarging points, to penetrate into and withdraw from the net. There must be two depressions at opposite parts of that circumference, which will cause the enlarging points 41, to be wholly withdrawn from the net at the time of taking up with either front or back point bars, at which time the net is to move upwards by the winding up of the lace roller; and immediately after that, when the ratchet wheel 48, is turned, a prominence of the wheel will come into action against the lever arm 45, so as to force the enlarging points 41, into the enlarged meshes of the net; and having done so, the next portion of the circumference of the wheel 46, may allow the enlarging points to be withdrawn a little from the meshes into which it has penetrated, and then afterwards to force them still further into the net than at first, so as to more effectually enlarge the meshes into which the points do penetrate, and the consequent squeezing up the surrounding small meshes; and that partial withdrawing and forcing in further may be repeated again before the time for completely withdrawing. The enlarging points should penetrate the net so near above the place where the back front points penetrate the same, that they cannot miss the enlarged meshes when the ordinary racking wheels have gone quite round, and a row of complete meshes of net have been worked. The next succeeding row of enlarged meshes into which the enlarging points are to be forced, will be in intermediate spaces between the enlarged meshes of the preceding row, and therefore the enlarging points must be racked endways in their row two single tier spaces. For this purpose a racking wheel 49, may be fixed on the upper end of the axis 9, and by an upright lever 50, which is poised on a centre pin projecting out from the main top standard and a connecting link 51, the requisite racking motion may be transmitted to the axis 43, which is capable of sliding endways in its bearings as far as the gage screw at the ends of its pivots will permit; and 52, is a spring to re-act against the racking wheel. And note, when this enlarging apparatus is applied to rotary machinery, the requisite motions, as aforesaid, may be given to the enlarging point bar 42, by suitable shapes fixed to the ordinary taking up cams, which actuate the taking up point bars; but the winding-up motion of the lace roller should not be perpetual, as is usual in rotary machines, but will be best derived from the taking-up action of the point bar: and note, the said enlarging apparatus may be applied to give effect to the

stripes of honeycomb open work which are making, according to my improvements, in some parts of the width of the net without taping threads, when the stripes of other parts of the same net have taping threads introduced, and therefore do not absolutely require the enlarging points on the bar 42.

Having now described my said improvements, I, the said William Crofts, do hereby declare, that the new invention, whereof the exclusive use was granted to me by the said Letters Patent, consists in applying to bobbin-net machinery which operates by traversing the carriages the means hereinbefore described, for enabling such machinery to make figured or ornamented net containing (or being composed of) large meshes of honeycomb work, as hereinbefore described; the essential character and property of my said means being to operate upon the warp threads belonging to the said open work, so as to transpose the adjacent pairs of such warp threads in manner hereinbefore described, each one into the space belonging to its neighbouring thread of the same pair, at those times when the bobbin threads are similarly transposed by their traversing action, in order that each bobbin thread, after traversing, may continue for a time to twist round the same warp thread that it twisted round before traversing, and so obtained prolonged twists for forming the pillars of enlarged meshes, which has not been hitherto accomplished in machinery which operates by traversing the carriages.

And I make no claim to any like application to machinery which operates by traversing the warp; and I claim as part of my invention, the combinations of ordinary taping apparatus with my said improvements, for the purpose of introducing taping threads into the small meshes of such honeycomb open work, as by and out of my improvements is in progress of making by bobbin-net machinery, which traverses the carriages in order, by such introduction of taping thread, to fill up and close the small meshes, and extend the enlarged meshes. I make no claim to any combination of taping apparatus, when such taping apparatus is used for the purpose of introducing taping threads into any other part of the net than that which is honeycomb open work: and I claim, as part of my invention, the application of enlarging points, as hereinbefore described, for distending the enlarged meshes of honeycomb open work, which is working with the aid of my improvements, by machinery which traverses the carriages, whether such honeycomb open work has taping threads introduced into its small meshes, or not.—[*Inrolled in the Rolls Chapel Office, May,* 1835.]

To GEORGE CHILD, *of Brixton, in the county of Surrey, gentleman, for an improvement or improvements in machinery for raising water and other fluids.*—[Sealed 23rd August, 1834.]

LEAST we should have mistaken this subject, we quote the words of the Patentee, who describes his invention as consisting in the application of certain endless bands or fabrics, which, being combined and caused to move with considerable rapidity, by means of rollers or drums, effect the raising of water and other fluids from one point to another with great facility. Plate XI., fig 2, represents a side view of the machinery, arranged according to the invention: within a building or shed, *a*, is the main driving shaft, which may be made to revolve by hand, by means of a winch, or by any other power; on this shaft a cog-wheel *b*, is fixed, which gears into a pinion *c*, on the axis of which another large cog wheel *d*, takes into another pinion *e*: upon the axis of this last pinion is a large band wheel or drum *f*, which by means of the band *h*, causes a smaller drum *i*, to revolve, and on the axis of the drum *i*, is a larger drum *j*, which by means of a band, drives a smaller drum on the axis of the wheel *k*. Upon the axis of this wheel two drums *l*, *l*, are mounted, over which the endless bands *m*, work. It will now be evident that if the gear below is set in motion, it will cause the wheel *k*, and drums *l*, to revolve quickly, which will cause the endless band or fabric to move with considerable rapidity: *n*, is a vessel or cistern containing the water which is wanted to be raised, and in this cistern are mounted two more drums *o*, (similar to the drums *l*, above,) over which the endless bands or fabric *m*, are distended. It will now be seen that as the endless bands *m*, revolve with considerable rapidity, they will carry up the water or other

fluid into the box or vessel *p*, above. It will be observed that as the bands *m*, pass into the box or vessel *p*, they pass through tubes *q*, which are placed there, in order to prevent the water running down again. Having thus described the nature of my invention, and the manner of carrying the same into effect, I will shortly describe the manner of action. It will be evident that by the arrangement of the wheel-work, a very considerable velocity will be given to the drums or pulleys *l*, and *o*, and by this means communicated to the endless bands or fabrics *m*, and consequently the water from the cistern below will be very rapidly raised. It is here worthy of remark, that the fabric generally employed is narrow woollen cloth, but I do not confine myself to the use of that fabric, but state it as the best known for that purpose; neither do I confine myself to the precise arrangement of wheel-work herein described, as it is evident that other arrangements might be made to obtain great speed; and I wish it to be understood that I do not claim the parts separately, but I do claim the combination of these pulleys or drums *l*, and *o*, and the endless belt or bands, with the required mill-work for driving the same, when such combination is employed for raising water and other fluids.—[*Inrolled in the Inrolment Office, February*, 1835.]

To John Brunton, *of West Bromwich, in the county of Stafford, engineer, for his invention of certain improvements in the construction of retorts for generating gas for the purpose of illumination.*—[Sealed 25th March, 1835.]

This invention consists in the methods by which the coal is introduced into, and propelled through, the retort,

and in the method by which the coke is expelled or discharged from the retort without interruption to the process of carbonization; and by the application of which methods, as hereinafter more particularly described, the retort is maintained in an uniform state of fulness, or nearly so, and the coal introduced and the coke discharged without exposing the interior surface of the retort to atmospheric air, or in any material degree suspending the process of generating gas.

Having thus briefly stated the nature of my improvements, I proceed to describe their construction and arrangements: first, premising that the letters in the several figures correspond with each other, and are intended to indicate corresponding parts of the apparatus.

Fig. 1, Plate XI., is a section of a retort with the various parts attached and constructed according to my improved plan. Fig. 2, is a front view of the feeder mouth-piece without the front cover, and shows the interior of the hollow piston, and the case in which it is worked. Fig. 3, is a front view of the feeder mouth-piece in which the piston is worked by a rack and pinion, instead of a screw, as in fig. 2. Fig. 4, is a section of fig. 3, showing the mode in which the rack and pinion are applied. Fig. 5, is a front view of a bench of retorts, in which there appear three fixed over one furnace. The middle retort is represented as having the top cover or lid raised, and shows the plan of the hinges as well as the lip round the outer edge of the lid, with falls into the narrow trough of loam, fine sand, or other material, by which the joint is made tight. Fig. 6, is an end view of the same bench of three retorts, exhibiting the exit pipe through which the gas passes to the hydraulic main, the discharge cylinder or shoot, through which the coke falls into the cistern or reservoir

of water, and the mode of fixing them to the end piece of the retort: A, fig. 1, is a section of a feeder, through which the coal or other material is introduced into the retort in a manner hereinafter described: *f*, is the cover or lid, having a lip to fall into a cavity or narrow trough *b*, *b*, surrounding the top of the feeder A; which trough is intended to contain fine loam or sand, or any other suitable material by which the joint may be made tight; the lid is fitted with strong hinges, as seen at *g*, in this figure, and also at *g*, *g*, in the top part of the middle retort feeder in fig. 5: *n*, is a diaphragm of sheet iron, or other suitable material fitted to the interior of the feeder A, and attached to a spindle *o*. This spindle passes through the side of the feeder A, being fitted and ground so as to prevent the escape of gas. To the outer end of the spindle is affixed a handle *h*, as seen in figs. 2, and 3, whereby the diaphragm *n*, is made to close and divide the feeder when required: *i*, is a spring catch for keeping the feeder divided; when a fresh supply of coals is required, the space above the diaphragm may at the same time form a measure of the quantity of coals newly introduced: B, shows the forcing apparatus, by means of which the coals or other materials are propelled through, and the coke is expelled from, the interior of the retort: *a*, *a*, is a longitudinal section of a piston, of which the transverse section is shown at *a*, *a*, fig. 2, having a cross bar screwed to it by screws, and a hole in the middle, in which is a nut or female screw to receive the screwed spindle *d*, and by which the piston *a*, *a*, is forced forward when required in propelling the coals and the coke through the retort. The screwed spindle *d*, has a collar fitted to the bottom of the stuffing box in the cover of the piston case at *c*, and the said spindle is retained in its place by a loose collar

of brass, fitted by screws, as seen at *e*, *e*: the outer end of the spindle is fitted with a gland *m*, and held down by screws, and is packed with hemp and tallow, or other suitable material usually employed for the purpose of preventing the escape of gas in other machinery of a like nature. To the end of the spindle is fixed a handle for turning the same; the lid or cover *c*, is screwed to the end of the piston case by screws, as shown at *c*, fig. 5, and jointed with pasteboard or other suitable material in the usual way: C, is a section of a retort, which is made taper for the purpose of facilitating the passage of the materials with which it is charged to the wider end; it is fixed to the mouth-piece or feeder at *r*, *r*, in the customary manner, with bolts and screws, cement, &c.: the length and diameter of the retort may be varied, or its shape altered according to circumstances: D, is a section of the end-piece of the retort, with the discharging cylinder or shoot F, through which the coke falls, or is discharged into a cistern of water E, and which end-piece is secured to the retort by screws, and jointed with cement at *s*, *s*: an end view of the same is shown in fig. 6. The discharging cylinder or shoot F, dips into the water so deep, as effectually to prevent the escape of gas. The exit pipe G, through which the gas is conveyed to the hydraulic main, is made of the usual form. The cylinder or shoot F, through which the coke is discharged into the cistern E, should be made the full width of the inside of the retort, so that no obstruction may arise to the clear discharge of the coke or other material. The end-piece of the retort is also supplied with a small lid or cover, which is secured by a small cross bar and screw, as described at H; and which may be taken off at any convenient time, for the purpose of examining the interior of the retort. Having giving a description

of the several parts of my improved retort, I now proceed to describe the mode of charging and working the same. The charges both as to time and quantity, must be regulated by the capacity of the retort, and the quality of the coal or other material used. Having myself been in the habit of using Staffordshire coal, I have found it most convenient to charge a retort of about four and a half feet long, and about twelve inches in diameter, at the small end, and eighteen inches diameter at the other, every hour, with about eighteen or twenty pounds of coal after the following manner. The diaphragm *n*, being shut and kept close by the spring catch *i*: the lid or cover *f*, of the feeder A, is raised, and the requisite quantity of coals introduced upon the diaphragm *n*, when the lid *f*, is again shut or closed. The coal remains in this position until the previous charge has been forced into the retort by the piston, as already described; and when the piston has been again drawn back, the diaphragm *n*, is let down, and the fresh charge occupies the space between the retort and piston, thereby keeping the heat from extending to the apparatus, as well as being ready to be forced forward into the retort when another charge shall be required.

It may be here observed, that it is not necessary that manual labour should be employed in forcing the charges into the retort, for where there is steam, or other power, by the application of a ratchet wheel, fixed on the end of the screwed spindle *d*, worked by a small ratch and lever, acted upon by an eccentric wheel, upon the revolving shaft, from the steam or other power engine, it may be so timed as to complete the process in any given period with the greatest precision, and a material reduction in labour. It will be obvious that whenever a certain quantity of coal is introduced into the retort by means of the piston *a*, *a*, an equal bulk of coke will

be discharged into the water cistern E, through the cylinder or shoot F, and may be removed from thence by means of a basket, or other receiver, placed within the cistern under the discharging shoot F, or by being raked into a barrow placed at the end of the cistern, or still keeping in view the economy of manual labour, the coke may readily be removed by an endless chain, worked by a steam-engine or other power, emptying it into a barrow at the end of a range of retorts. I have thus described my improvements in the construction of retorts for generating gas for the purpose of illumination. I have represented by fig. 1, in the drawings annexed, a retort set in the ordinary position, though not exactly in the ordinary shape; it is described as open at both ends, the coal being introduced at one end, and the coke discharged at the other. To this I lay no claim, nor do I confine myself to the precise modification of the various parts of the retorts, as described in the figures hereunto annexed, nor to the materials of which they may be formed; but I have shown that which I consider to be the best arrangement for a coal-gas retort, and which I have found practically to answer. What I claim as my invention is, the arrangement and combination of the various parts of the retort by which the coal is first introduced into, and afterwards propelled through, the retort, and the coke discharged from it, by which means the retort is kept at an uniform fulness, introducing and discharging simultaneously bulk for bulk of coal into the retort, and coke out of it into a cistern of water, without exposing the interior of the retort to the cooling effect of atmospheric air, and in a great measure avoiding the loss of time, the waste of gas, and the laborious operations necessarily attendant on the usual methods of charging and discharging retorts. The retort

which I have described, is adapted for generating gas from coal, which is the material generally used for that purpose; but should any other material be used requiring a different adaptation of the several parts above described, such adaptation may easily be effected by persons conversant with the subject.—[*Inrolled in the Inrolment Office, Sept.* 1835.]

To RICHARD COAD, *of Liverpool, in the county of Lancaster, manufacturing chemist, for his invention of certain improvements in the means or apparatus for consuming smoke and economizing fuel in furnaces, which improvements are particularly applicable to furnaces of steam-engines employed for navigation, and other purposes.*—[Sealed 10th July, 1835.]

THIS invention of certain improvements in the means or apparatus for consuming smoke and economizing fuel in furnaces, which improvements are particularly applicable to furnaces of steam-engines employed for navigation, and other purposes, has for its object a more perfect combustion of the inflammable gases and unconsumed particles of carbon, which, in the ordinary construction of flues, pass up the chimney in the form of smoke.

This invention consists in arresting or regaining a portion of the heat from the vapours emitted from the combustion of fuel in the furnace during their passage up the chimney, by an apparatus placed in a part of the flues or chimney beyond the boiler, and bringing back a portion of the heat (which would otherwise be wasted or lost), by means of currents of fresh atmospheric air, and introducing the same below the boiler at or near the bridge of the furnace, for the purpose of consuming the smoke.

The apparatus which I propose to employ, consists of air pipes, tubes, or an air chamber or chambers, placed in

or beyond the flue or flues of the boiler, or in the chimney, in such a manner as not to interrupt or interfere with the draught: or the said air pipes or tubes may be placed in a chamber situated intermediately between the boiler and the chimney, the said air pipes being open at one end to the atmosphere, for the admission of currents of fresh air, such currents being induced either by natural or artificial means, the other ends thereof being open to the furnace at the bridge, as hereinbefore mentioned. By these means the fresh air becomes heated in its passage through the said pipes, tubes, or chambers, by the heated vapours proceeding through the said chamber, flues, or chimney, from the fire-place.

The Patentee has shown in his specification several methods of carrying the said invention into effect; but it is obvious that the principles on which his improvements are founded admits of considerable variation in the modifications of apparatus capable of producing similar results. He says, I am aware that many plans for consuming smoke, and effecting the more perfect combustion of fuel, and also for supplying heated air to furnaces, have been brought into operation: for instance, currents of heated air have before been conducted to the bridge of the furnace, and directed upon the burning fuel or gases arising therefrom; but such air has been heated in a chamber by a separate fire, or by the furnace or flues of the boiler, by which means the boiler has been injuriously deprived of heat by such operation. There have also been plans proposed for abstracting the waste heat from the exit vapours during their passage up the chimney, by means of currents of fresh atmospheric air proceeding along pipes placed within the chimney; but the air so heated and abstracted has been employed, or intended to be employed, exclusively for supporting the combustion of the fuel in the furnace by introducing it into an enclosed ash-pit, and passing it upward

into the furnace through or between the fire-bars: whereas my invention consists in abstracting the waste heat or caloric from the vapours escaping up the flues or chimney by means of currents of fresh atmospheric air made to pass through pipes or chambers placed in, or in connexion, with such flues or chimneys, and directing the said fresh atmospheric air so heated and obtained on to the uninflamed smoke or gases arising from the combustion of the fuel at or near the situation of the bridge of the furnace, for the purpose of promoting a more perfect combustion of the smoke and inflammable vapours at that point of its egress.

Plate XI., fig. 7, is a vertical section of a furnace, boiler, and flues, taken longitudinally, for the purpose of showing a method of carrying my said invention into effect, by means of coiled pipes placed in the chimney, which pipes are open at one end to the atmosphere, and at the other end to the interior of the furnace at or near the top of the bridge: A, is the boiler; B, the fire-place or furnace; C, the fire-bars; D, the bridge; E, E, the flues; F, the chimney; G, G, a series of pipes or tubes of iron, or other suitable metal, the outer extremities of which pipes or tubes are passed through the side of the chimney, and are open to the atmosphere. These said pipes should in every case have such a number of coils given to them, and present such a surface to the action of the heated air and gases passing up the chimney, as would render them capable of absorbing the available heat. The lower extremities of the said pipes lead into a larger tube H, H, which forms a passage to the bridge D, and there terminates in a long narrow slot or opening, or a series of small openings, at or near the top of the bridge, so as to direct a current of fresh air upon the uninflamed smoke, where, by means of this current of fresh heated air, a more perfect combustion of the smoke is effected.

In cases where the draught of the chimney is not sufficiently strong to induce the required current of atmospheric air to pass through the said pipes so as to enable the smoke to be effectually consumed, I employ a wind-fan, or other mechanical means, for forcing a proper quantity of air through the said pipes.

Fig. 8, shows another method of carrying my said invention into effect, in which a series of bent pipes G, G, are placed nearly vertically in the chimney instead of in coils, as represented in fig. 7. The outer ends of the pipes G, in this instance, are open to a chamber I, I, under the ash-pit, where the air will receive a partial warmth before it enters the pipes G. The same letters of reference being marked on the corresponding parts in this and the following figures, as also in fig. 7, no further description will be necessary.

Fig. 9, shows another mode of effecting the same object by a series of short tubes G, G, placed horizontally across an enlargement of the chimney at its lower part, one end of each of the said tubes communicating with a chamber K, which said chamber is open to the atmosphere by the short pipe L; the other ends of the said short pipes terminate in the chamber M, from which the pipe H, descends, and passes to the bridge. In the said fig. 9, I have represented the manner of employing a wind-fan, which is shown at N.

In adapting my said invention to the furnaces of steam boilers of marine or locomotive engines, I prefer using a hot-air chamber at the lower end of the chimney, as shown in a sectional elevation at fig. 10, and in a horizontal section at fig. 11, with tubular flues passing through the hot-air chamber: F, F, is the chimney or funnel; D, D, a cylindrical chamber introduced into the chimney, resting on brackets; P, P, represent a number of vertical pipes or tubular flues carried through the cylindrical chamber for the passage of the hot vapours and gases from the furnace to the chimney;

Q, Q, are short pipes, for the admission of atmospheric air into the chamber D, which air, after having become heated by its passage between the pipes P, P, P, within the chamber, proceeds through the larger tube R, which is connected by a cone and socket to the pipe H, and is discharged at the bridge of the furnace, for the purpose of inflaming the smoke, as hereinbefore mentioned.—[*Inrolled in the Rolls Chapel Office,* 1836.]

To JOHN CHESTER LYMAN, *of Golden-square, in the county of Middlesex, for certain improvements in hulling, cleansing, or polishing rice, bearding or peeling barley, and hulling or cleansing coffee.*—[Sealed 24th June, 1834.]

THE Patentee, in his specification, describes his invention as consisting in the adaptation of two flat circular discs of the shape and form of a millstone, five to six feet in diameter, which he calls polishers: they are worked by suitable gear, one above the other, in a similar manner to grinding stones at a grist mill; the upper disc is supported by a vertical shaft, so as to ensure a regular motion; and it performs almost one hundred revolutions per minute: the lower disc is supported upon a horizontal frame or platform, and has rotary motion communicated to it by means of a vertical shaft underneath.

The Patentee prefers these discs to be made entirely of wood, or the wooden disc may be fastened in a cast iron frame: the surfaces of these disc are covered with common wire cards, the teeth of which are about an inch long, so that the disc of wi care rds will produce

an uniform plane, except a slight cone towards the centre.

Previous to the paddy or rough rice being operated upon by the machine, it is sifted for the purpose of cleansing it from any dirt or other extraneous matter: after this process, it is operated upon by a pair of mill-stones, for detaching the husk or hull of the grain in the common manner of shelling grain; after which, it undergoes the operation of the fan, for separating the chaff from the grain. The rice or other grain being thus prepared, it is removed to the Patentee's improved machine, which is represented in section, in Plate XI. at fig. 13: *a*, is the framework of the machine; *b*, and *c*, the discs, the lower one of which is set in motion by the vertical shaft *d*, which is driven by the bevel gear *e*: the lower disc rests on a metallic plate *f*, which is supported by the framework, and by this means, the lower disc revolves in a steady, unvarying, and unshaken motion; and as the discs revolve rapidly, the grain describing a convolute curve, is brought by the wire cards to the edges of the discs, from which it is thrown out, and is prevented from scattering and escaping, by means of a high case, which encloses the discs, and leads it to the spout.

The Patentee then states, that the form of the polishers may be varied considerably, by substituting a vertical cone with a horizontal runner, running in a vertical direction, for the flat disc, the grain being supplied at the apex.

The Patentee states, in conclusion, that some parts of the apparatus having been before used, he does not mean or intend to claim them; but he claims the exclusive use of the parts termed polishers.—[*Inrolled in the Inrolment Office, December,* 1835.]

SCIENTIFIC NOTICES.

(Continued from p. 258.)

POLITICAL ECONOMY.—COMMISSION OF INQUIRY INSTITUTED BY ORDER OF THE FRENCH GOVERNMENT FOR THE REGULATION OF DUTIES UPON, AND PROHIBITIONS OF, FOREIGN MANUFACTURES, &c.

The sixth question submitted to the Commission, was upon the glass manufacture in France. We proceed to condense the subject as reported from the Memoirs and Extracts as published in the *Recueil Industriel*, No. 18.—1st Article.

This subject is treated at great length upon interrogatories addressed to M. S. Flachat, and to M. Clément Desormes, who had been heard upon the question relative to the potteries, and to other principal proprietors and manufacturers connected with the glass-houses.

M. S. Flachat maintained, in respect to the glass manufacture, the same propositions he had advanced upon the subject of the potteries, viz. the entire suppression of the duties upon pit-coal, soda, potass, and lead, in order to facilitate the more general use of glass, by furnishing it at a lower rate. Complaints were made to the Councils, upon the association which had been lately formed by the manufacturers of glass. The answers of M. Clément Desormes are given on account of their importance, at length, to the following effect:—

Upon the processes used at the plate-glass manufacture of St. Gobain, he could not give information without orders from the Direction, but upon the general questions relative to the manufacture of ordinary glass, and of crystal, or best flint-glass, he stated—"That the glass manufacture had made great progress in France. Window glass sold at 60 centimes (6d.) the leaf or square of 28 inches by 18, equivalent to 3½ square feet.* The price is nearly the same in Belgium. The Belgic glass-houses

* The French foot is equal to 13 inches English, nearly.

have the advantage over us of cheap coals; but this is counterbalanced by the price of sulphate of soda, which costs more there than with us. Here the price is about 20fr. the kilogram; in Belgium it is 30fr. to 33fr. This flux forms the greatest portion of the expense in the manufacture of window glass. The cost of coal constitutes the main feature of expenditure, but is only about half the amount of the sulphate of soda. We export the sulphate to Belgium from the manufactory at St. Gobain, but principally from those of Marseilles: all things considered, the expense of the manufacture is at present in France nearly the same as in Belgium. The cost is higher than in England, which is favoured by the low price of its coal, but the English glass-houses consume larger quantities of coal than ours do.

"I have visited several glass-houses in England, and I have observed that they often consume three times the quantity of coal that we do in France, to make the same quality of glass. Thus, the English, who have their coals at one-third of the price of ours, do not work to any profit on account of this, their advantage. It is my opinion, that if we have to fear a collision, which is not highly probable, it would be on the part of Belgium, since the cost (of production) is nearly the same in both countries.

"In respect of crystal or best flint-glass, the same observations will generally apply as to common glass, because the process of manufacture is nearly the same in both sorts. There is an import duty upon lead and upon minium, which effects to a certain extent the French manufacture of glass, but that might be balanced by an import duty upon foreign crystal; generally, the price of labour in this manufacture is not dearer in France than abroad. In Belgium, the workmanship of both kinds is about the same price as here."

The Commission then proceeded to questions upon the process and the expenses of the glass manufacture in various places, for the purpose of drawing a comparative view of the advantages of the localities, and took in succession, information upon the fabrication of plate-glasses and mirrors, lustres and drops of crystal, and flint glass.

The importation of all sorts of glass is prohibited in France, excepting silvered (étamées) glasses and mirrors, which are admitted upon payment of a duty nearly prohibitive.

MIRRORS AND LOOKING (PLATE) GLASSES.

At present there are but two manufactories of plate-glass in the kingdom—that of St. Gobain and that of St. Quirin-et-Cirey; but mirrors are made in the usual glass-houses. Nuremberg supplies a considerable quantity of mirrors; but as a competition from foreign manufacture was not to be apprehended, the Commission did not recommend any alteration of the duties.

CRYSTAL, LUSTRES, AND DROPS FOR LUSTRES.

There are four establishments in France for the manufacture of these descriptions of glass, and the projected plan for uniting at Paris the sale of the glass made at these manufactories excited considerable discussion, which is not interesting to a foreign journal. A depot has been formed for this purpose.

M. Godard, in his evidence, stated, "That the English excise duty upon glass was enormous,* and that they did not make common glass. In England there existed eighty furnaces which manufactured crystal (flint glass); in France only four manufactories, which employ seven furnaces. From hence you may observe, that it would be easy for the English to effect a decisive injury to our establishments: they have only to increase their manufacture by one-twentieth; this increase might lower the price, but this branch of manufacture is so well established with them, that they could well support a momentary depreciation: the sacrifice would enable them to throw four or five million francs of crystal into our markets, and depreciate our manufacture. If, then, the prohibition should be annulled, it should be replaced by a very heavy duty of entry."

General questions were then submitted to M. Godard, upon the amount of French glass manufacture, its nature, consumption of fuel, &c. M. Godard answers, "that at the close of the pre-

* The excise duty here has been since lessened.

ceding year to July, Baccarat had three furnaces at work, which produced in amount of sales 1,200,000fr., including the glass cutting, which formed 250,000fr. to 300,000fr. of the expenses. The manufacture of St. Louis produced glass to the amount of 900,000fr.; the two small establishments of Berey and of Choisy 450,000fr.; so that the whole produce of sales amounted to 2,750,000fr.

"At our establishment we manufacture five to six thousand different articles, the principal object is goblets* for the table, of which we sell seven to eight hundred thousand per annum, at an average price of 32 centimes ($3\frac{1}{4}$d. English), from which we deduct an allowance of 15 per cent. to the wholesale vender, which leaves about 27 per cent. The goblet is an article of disadvantageous manufacture, like plates, in the potteries and china works.

"There is at present a general diminution of prices;—apparatus connected with lamps may be estimated at a fall of 50 per cent. The capitals employed in the crystal glass-works are—in ours of Baccarat, two millions of francs; in St. Louis, one million and a half francs; Berey and Choisy, a quarter of a million francs each, making a total of four million francs capital (160,000*l.*).

"We use wood in our glass-houses; they are all situated in the forests. The works at St. Louis have a forest-right (affouage), which they hold in perpetuity at a rent charge, which was fixed a long time ago. We have not a forest-right, and consume about five to six thousand fathoms of wood annually, at an expense of 110,000fr. to 120,000fr. We use coal occasionally, when wood is scarce. We work our machinery by water—that of St. Louis is worked by steam. Our cost of combustibles is from 11 to 12 per cent. upon our glass proceeds. Our workmen obtain—some 300fr. per month, others 20 sous (10*d.* English), per diem; our cutters work by the piece; our glass-blowers

* Tumblers, or drinking glasses. The French do not use wine glasses at table, but only for particular sorts of superior wines.

have fixed and supplementary prices. Our costs for hand work amounts to 500,000fr. per annum. We use in our three furnaces 300,000 kilogrames of lead (3000 tons). We possess but little lead in France; we obtain it from Spain, Germany, and England. We consume 1500 metrical quintals (750 tons) of potass, at 110fr. the 100 kilogrames (46s. per cwt. English), and of sand, 4700 quintals (2350 tons), at 8fr. to 9fr. the 100 kilogrames (about 3s. 6d. per. cwt.).

"We scarcely export any thing to England excepting candle-stick sockets (bobèches), nor to America; but we send small quantities to Spain, Italy, and even to Constantinople. The Americans prefer English articles, and also possess some crystal manufactories. The exportations last year amounted to about one-eighth of the sales. The permission to import foreign silvered glasses and mirrors into France does not affect our manufactories, because we have scarcely any at present of mirrors, although the company of St. Quirin is about to extend this branch of its works: and as to large-sized plates of glass, we make them better than any other country does, and have, therefore, no fear of competition. In respect to crystals (fine flint-glass), the case is different. They make in England beautiful flint-glass: our crystal is whiter and more brilliant than the English, but theirs has something more soft and pleasing to the eye; which effect may arise from their mode of fusing the metal. The English charge and fuse only once in the week—we fuse four to six times, according to the arrangement of our work. They are not under the necessity, as we are, of being niggardly of their fuel. England, as well as Belgium, is placed upon coal-mines; its means of transport are easier than ours, and she is exempt from duties upon lead and potass. A considerable duty upon foreign crystal would scarcely prevent a fatal competition on the part of Belgium.

"In respect to the importation of glass drops or bobs for lustres from Bohemia, we need not fear any collision; although this branch of our manufacture costs three or four times as much, and enhances the price of lustres 20 to 40 per cent. according to

the mode of fitting up: our superiority of manufacture in this branch leaves the Bohemian lustres at an immeasurable distance. Our artists do not make use of Bohemian pendules, excepting they are specially ordered.

"But in regard to crystal (flint-glass), applicable to other usual purposes, no doubt can be entertained that if foreign supplies are not checked by an import duty, amounting to a prohibition, their introduction would effect a great injury to our native industry. To this view is opposed the assertion, that foreign competition would occasion the necessity of bringing our manufacture to a greater degree of perfection. I answer, that before we had the motives to improve this branch of our trade, which now urge us, were not the English and other nations in the foreign markets competing with us? Are we not internally pressed by the ordinary glass-works, which every day encroach upon the crystal-works? We may be assured that in our progressive march, we may safely repose upon our well understood interests, and the great emulation which actuates our manufacturers."

The examination of M. Bontems, whose manufactory at Choisy-le-Roi comprises, beside crystal, the making of glass rings, beads, &c. (verroterie), and of window glass, excited great attention. He maintained the necessity of a reduction of the duties upon potass and lead, *in order to enable them to compete in foreign markets with England.* The duty upon lead made a difference equivalent to 15 per cent. upon the raw material, and of nearly 40 per cent. upon the articles completed for sale. "Crystal contains one-third of lead and one-sixth of potass: lead pays a duty of 6fr. per kilogram (2*s.* 6*d.* per lb.), and potass 18fr. per kilogram (7*s.* 6*d.* per lb.).

"We principally make goblets (tumblers) for the table, but they are an article furnished at a very low price; a goblet weighing half a pound, only sells for 32 centimes (3¼*d.*). In England, the goblet or glass without feet (tumbler) is not generally used as in France; glasses with feet are there more usual. The selling price in England of most articles (glass) is less than with us,

because their raw materials are generally cheaper; but their excise duty compensates for this, and shackles their prosecution of this branch of industry to that extent, that we regain a portion of the disadvantage in the cost of our materials; *but if the excise duty were suppressed*, the English manufacturers would soon be upon a level with us in this respect. We sell few articles of glass manufacture in England, excepting fancy articles. Our glass trade has there to strive against the custom and the excise duties, amounting together to about 50 per cent. upon the original value.

"The price of window glass is about 70 centimes the kilogram; in England the price is higher, but they have a common glass which they sell for exportation, which is cheaper. In France, common window glass sells more readily than superior qualities—in England, the contrary; so that the English export their bad qualities, for which they could scarcely find a sale at home. Against the introduction of general articles, we want, as it regards England, a protecting duty of 20 to 25 per cent. *ad valorem;* but so high a duty is not necessary upon window glass. Belgium, as well as England, has the advantage of us in fuel; but as to Bohemian glass, the disadvantages to us are greater, for we pay 40 sous (1*s.* 8*d.*) for workmanship that costs but 3 or 4 sous in Bohemia.

Several manufacturers were examined as to the competition experienced from Bohemian glass ware; they agreed that the low price of work there prevented the sale of cut flint glass of French manufacture to a great extent. It was the general opinion of the manufacturers, that foreign glass-works were conducted with such decided advantages over the French establishments, that the latter could not only ill support the competition, but would, without high protecting duties, be certainly eventually ruined. The Chamber of Commerce of Marseilles required a moderate duty only upon lustres and pendents, equivalent to the premium paid upon contraband traffic. The Chamber of Commerce of Paris looked to the union of the four great crystal manufactories, and their depot formed at

Paris for the sale of their united products, as a monopoly which would have the effect of destroying the competition of foreigners.

VERROTERIE, OR THE GLASS OF COMMERCE.

This kind includes glass made in forms and moulds. The manufactories are in the north of France, and at Marseilles; which latter place, with the department of Var, contains eight glass-houses, employing six to eight hundred workmen.

BLACK, OR BOTTLE GLASS.

The manufacture of this article is very considerable. In the year 1832, the value of bottles exported amounted to 2,700,000fr. The discussions upon this branch of trade related more particularly to the Belgic and German interests than to British; we shall therefore merely state that some manufacturers thought that a protecting duty should be set upon the importation of Belgic demi-white glass, and that an export duty of 15 per cent. *ad valorem* levied upon French glass containing liquors should be remitted.

The principal points in this examination which effect British commerce, are those relating to the introduction of lead, minium, potass, and soda, at a reduced scale of duties, which all parties concur in demanding. It will be seen by the new tarff submitted to the Chamber des Deputés, that the Commission has proposed a general, and, in some instances, a large reduction of the duties upon those very essential articles to the French manufacturers of glass, with which they can only be supplied by foreigners. With these few observations, we shall conclude our report of this portion of the examination.

FRANCE—PATENTS.

The facilities afforded by the French law of patents, under which they may be obtained for either the term of five, ten, or fifteen years, at the option of the inventor, at a moderate graduated charge for the several terms, undoubtedly tend to the encouragement of their native talent, and the introduction of useful foreign discoveries. During the latter three months of

the last year, no less than one hundred and forty-five brevets d'invention et d'importation were granted by the French government; a number which exhibits an increasing activity in the efforts of their inventive talent, and the appropriation to themselves of the advantages resulting from the inventions of other nations. The larger proportions of the French patents issued, has been granted for inventions relative to printing; to the manufacture of native sugar from beet-root; to the fabrication of stuffs, and woollen and silk goods, by machinery, and steam improvements to general improvements in machinery; to dyeing, perfumery, medicinal preparations; to the fine arts, and to improvements in musical instruments. Many of the French patents may appear to our scientific inventors, of a secondary order of importance: some may be trivial; but it is to be remembered, that every improvement tends in some degree to advance the practical knowledge of the arts; and at the same time rears and employs workmen who would otherwise not be required. The important results of a full encouragement to the inventive talent in a political and national point of view, appear to be more fully appreciated by the French government than by our own, at least that code of laws for the protection of patent property, and for the eliciting of inventive talent, is far preferable to ours, even with its late improvements. The enormous expense of our patents, and the other disadvantages of our system, claim the most immediate attention of our Legislature. If the subject be again brought under the notice of Parliament, as it seems probable it will be, we trust that a real and effectual improvement may be the result of its next interference. In this Journal we have had the entire system analysed, and improvements proposed upon broad political and public considerations. We have advocated the most extended views of amelioration; not, as we are charged by some contemporaries, upon the narrow, selfish grounds of interested motives, but because we feel that the great interests of the empire are closely connected with a real and extensive improvement of our patent laws. We are happy to know that many influential and well-

informed members of the Commons on each side of the House fully appreciate the absolute necessity, upon high public grounds, of placing patents within the reach of the great body of inventors in this United Kingdom, and of effectually securing them in the prosecution of their useful labours.

PARIS.

On Saturday, April the 3rd, M. Ducot, in the Chamber des Deputés, brought up the long-expected report of the Committee relative to the proposed modifications of the tariff of Customs, which has been the subject of so much interest to the French manufacturers and merchants for three years past. The Chamber generally felt that the session was too far advanced to allow of any modification of the existing duties. Had it been entertained and discussed in its complicated bearings upon the home manufactures and the foreign commerce of France, the great collision between the advocates of free trade and the exclusionists would have taken place, and the respective force of the parties in the French House of Commons would have been estimated by the result of the debates. The consequences of any liberal alteration of the existing system of the French duties as affecting our staple manufactures, especially our cloth, pottery, and Birmingham branches, and also our iron and coal works, would prove of the highest importance to the commerce of Great Britain, as may be ascertained by those who may be induced to give their attention to the very important examinations of the united Committee of Inquiry, the report of whose labours we continue in this number. This is the fourth session in which the consideration of the projected alterations of the French tariff has been postponed to the following session. The continued indisposition of the successive French administrations to modify the prohibitory character of their customs, and to make it more conformable to the enlightened views of their best political economists, and to the real interests of France, is kept in action by the constant fear of the effects of the superior combination of British capital and skill, and by the alarms of many classes of

French interests which are strongly represented in their Chamber of Deputies. Neither the French Government nor the people are yet sufficiently matured upon the subject of free commercial intercourse between the rival nations, to see that their mutual interests would be essentially forwarded by a perfect reciprocity in the fiscal regulations of the two countries: hence the continual procrastination of those wise measures on the part of our neighbours, which can alone set to rest the annual excitement which the agitation of the question by the conflicting interests must necessarily produce.

The endeavours of our own Government, for a length of time past, to produce this reciprocity of Custom House regulations, aided from time to time by strong and rational representations of individuals of this country in respect of particular branches of commerce, have hitherto failed in operating any change in the *principle* of the French tariff. Upon this subject the *Times* journal of 5th of April well observes, "the prohibitory system, which is nothing less than a continuation of the system adopted under the imperial régime, will, in all probability, continue for years to come in France.

"Neither the Government, nor the Legislature of that country have yet had either leisure or inclination to devote to questions relative to its more substantial interests, any portion of that attention which they have chosen to bestow on matters connected with its political condition. The Government established by the effects of the revolution of 1830, does not seem to consider itself yet sufficiently fixed, to venture on so vast an undertaking as a thorough reform of the evils of monopoly, to which several years of existence have given an extensive root. As to the members of the Legislature, they are either personally interested in the continuation of the present system, or afraid to agitate any question as to its abolition—which would indispose an influential, although a small portion of the community against the political order of things, which it is their anxious wish to see maintained."

Notwithstanding the present appearance of this important

question, its bearings are of such moment to our staple manufacturers and mineral capitalists, that we propose continuing the report of the series of examinations which we have announced: and which will necessarily have a great and direct bearing upon the fiscal regulations which may be eventually determined upon by the French Legislature. The *Recueil Industriel*, from which we condense our notices, has not been regularly transmitted to us; and until we can obtain the numbers which continue the regular series of the examinations, we are obliged to present our readers with the results of the examinations upon the sixth and seventh questions relative to the glass manufactures, and to the plated goods of France; two of the most important branches of inquiry, as affecting our British manufacture of, and commerce in, these articles.

PARIS.—FRENCH TARIFF OF CUSTOMS.

Although the consideration of the report of the Committee appointed by the Chamber des Deputés has been postponed to the following session—it may be interesting to our manufacturers, and to the readers of this Journal, to be informed as to the nature of the alterations proposed by the Committee, which were principally to the following effect. The duty on spun cotton yarn, above No. 143, to be 7fr., including the decime or halfpenny war-tax; on silk handkerchiefs, undressed, a reduction is proposed from 10fr. as fixed by the Royal ordonnance to 6fr. The Committee propose the admission of printed silk handkerchiefs from all countries, upon payment of a duty of 12fr. per kilogram, equal to 10s. upon the two pounds weight. Raw wool to pay a duty of 10fr.; cocoa 10fr. per quintal. These two articles and the Greges silks to be admitted, as heretofore, on the conditions specified in the ordonnance.

Iron manufactured in the English manner, to pay a duty of 18fr. 75c. the quintal; equal to 112lbs. English. The duty upon iron smelted by means of wood, and hammered, to be reduced one-fifth.; on iron chains for the use of the navy, 37fr. 15c. the quintal.

It is proposed by the Committee to maintain the three distinct duties levied upon the importation of pit coal to the three several divisions of the kingdom; namely, the northern, the central, and the southern.

The duty upon Havannah cigars to be reduced from 90fr. to 50fr. (the quintal). Nitrate of soda and potass to be reduced from 15fr. to 5fr. per double quintal (2 cwt.). The duty upon iron rails and trams for roads to be reduced from 25fr. to 5fr. the double quintal, or 100 kilograms, equal to 2 cwt.

List of Patents

Granted in Scotland since 21st April, 1836.

To Frederick Edward Harvey, of the Horseley Iron-works, Tipton, Staffordshire, mechanical draftsman, and Jeremiah Brown, of Tipton, roll-turner, for certain improvements in the process and machinery for manufacturing metallic tubes, and also in the process or machinery for forging and rolling metal for other purposes.—22d April.

— William Maughan, of Newport-street, Lambeth, chemist, for certain improvements in the production of chloride of lime, and certain other chemical substances.—25th April.

— Thomas Ridgway Bridson, of Great Bolton, bleacher, for a certain improvement or improvements to facilitate and expedite the bleaching of cotton, linens, and other vegetable fibres. —25th April.

— Joseph Lidel, of Arundel-street, Panton-square, London, professor of music, in consequence of a communication made to him by a foreigner residing abroad, for certain improvements on piano-fortes.—28th April.

— Andrew Smith, of Princes-street, in the parish of St. Martin's, London, engineer, for certain improvements on engines for exerting power for driving machinery, and for raising and lowering heavy bodies.—28th April.

— John Burn Smith, of Salford, cotton-spinner, and John Smith,

of Halifax, dyer, for a certain method or methods of tentering, stretching, or keeping out cloth to its width, made either of cotton, silk, wool, or of any other fibrous substance, by machinery.—28th April.

To Robert Copland, of Brunswick-crescent, Camberwell, for improvements upon patents already obtained by him for combinations of apparatus for gaining power.—6th May.

— William Preston, of Sunnyude, Lancaster, operative calico printer, for certain improvements in printing of calico and other fabrics.—10th May.

— Henry Sharpe, of Broad-street-buildings, London, merchant, in consequence of a communication made to him by a foreigner residing abroad, for improvements in sawing wood and other materials—10th May.

— James Cropper, of Nottingham, lace manufacturer, and Thomas Brown Milnes, of Seaton Works, Nottinghamshire, bleacher, in consequence of a communication made to them by a foreigner residing abroad, for certain improvements in machinery or apparatus for embroidering or ornamenting bobbin-net or lace, or cloths, stuff, or other fabrics made from silk, cotton, wool, flax, or hemp.—10th May.

— Jacob Perkins, of Fleet-street, London, for improvements in the apparatus and means for producing ice, and in cooling fluids.—13th May.

— William Gossage, of Stoke Prior, chemist, and Edward White Benson, of Wickbold, chemist, for an improvement or improvements in the process of making or manufacturing ceruse or white lead.—20th May.

REWARDS

Adjudged by the Society of Arts, during the present Sessions, presented by Vice-Admiral Sir E. Codrington, G.C.B., F.R.S, Vice-President.—7th June, 1836.

1. To Mr. E. Solly, jun. Curzon-street, May-fair, for an instrument to drive screws on the inside of tubes, the silver Isis medal.

2. To Mr. H. Bellingham, Frederick-place, Hampstead-road, for a carpenter's plane, the silver Isis medal.

3. Mr. P. Heath, Edward-street, Hampstead-road, for a ruling machine for the use of engravers, the large silver medal.

4. To Mr. J. Meighan, Holland-street, Blackfriars, for his alarum lock, the silver Isis medal and *5l.*

5. To Mr. H. Wilkinson, Pall-mall, for a maroon lock to prevent depredations in gardens, parks, preserves, &c., the large silver medal.

6. To Mr. Joseph Gretton, Timberfield, near Chesterfield, for his levelling instrument for coal miners, the large silver medal.

7. To Cornelius Ward, Great Titchfield-street, for his improvements in kettle drums, the gold Isis medal.

8. To Mr. H. Soper, gunner of H.M.S. Excellent, for his life buoy, the silver Isis medal and *5l.*

9. To Mr. H. G. Pearce, Brunswick-terrace, Blackwall, for his lantern for steam vessels, the large silver medal.

10. To the same, for his disengaging claw for a chain cable, the large silver cable.

11. To Mr. J. Kingston, royal dock-yard, Woolwich, for his nippers for holding metal bars, the large silver medal.

12. To Mr. James King, New South Wales, for his discovery, in the colony of Sydney, of a white sand for the use of glass-makers, the large silver medal.

13. To Mr. Joseph Glynn, Butterley, near Derby, for his communication on the application of steam power to draining of fens, the gold Isis medal.

14. To Mr. J. Newman, Regent-street, for his improved safe lamp for miners, the large silver medal.

15. To Mr. James Marsh, Royal Arsenal, Woolwich, for his method and apparatus for detecting minute quantities of arsenic, the large gold medal.

New Patents
SEALED IN ENGLAND,
June, 1836.

To Joseph Bencke Gerothwohl, of Camberwell-grove, in the county of Surrey, merchant, for certain improvements in filtration, being a communication from a foreigner residing abroad.—Sealed 28th May—6 months for inrolment.

To Francis Pettit Smith, of Hendon, in the county of Middlesex, farmer, for his invention of an improved propeller for steam and other vessels.—Sealed 31st May—6 months for inrolment.

To William Gossage, of Stoke Prior, in the county of Worcester, for his invention of certain improvements in the apparatus or means used for evaporating water from saline solutions, and in the construction of stoves for drying salts.—Sealed 2nd June—6 months for inrolment.

To Luke Hebert, of Paternoster-row, in the city of London, patent agent, for certain improved machinery and processes for economizing and purifying the manufacture of bread, a part of which is applicable to other purposes.—Sealed 2nd June—6 months for inrolment.

To Baron Henry de Bode, major-general in the Russian service, of Edgeware-road, in the county of Middlesex, for his invention of improvements in capstans.—Sealed 4th June—6 months for inrolment.

To Manoah Bower, of Birmingham, in the county of Warwick, for his invention of improvements applicable to various descriptions of carriages.—Sealed 7th June—6 months for inrolment.

To John Young, of Wolverhampton, in the county of Stafford, patent locksmith, for his invention of certain improvements in the making or manufacturing of metal hinges for doors, and other purposes.—Sealed 7th June—6 months for inrolment.

To Daniel Chambers, of Carey-street, Lincoln's-inn, water-closet manufacturer, and Joseph Hall, of Margaret-street, Cavendish-square, plumber, for their invention of an improvement in pumps.—Sealed 7th June —6 months for inrolment.

To Miles Berry, of Chancery-lane, Holborn, in the county of Middlesex, mechanical draftsman, for certain improvements in machinery or apparatus for cleaning, purifying, and drying wheat, or other grain or seeds, being a communication from a foreigner residing abroad. Sealed 7th June—6 months for inrolment.

To Amos Gerald Hull, of Cockspur-street, Charing-cross, in the county of Middlesex, Esq., for his invention of improvements in instruments for supplying the prolapsed uterus.—Sealed 9th June—6 months for inrolment.

To Edward Massey, of King-street, Clerkenwell, in the county of Middlesex, watch-maker, for his invention of certain improvements in the apparatus used for measuring the progress of vessels through the water, and for taking soundings at sea.—Sealed 13th June—6 months for inrolment.

To Jacob Perkins, of Fleet-street, in the city of London, civil-engineer, for his invention of improvements in apparatus for cooking.—Sealed 13th June—6 months for inrolment.

To Miles Berry, of Chancery-lane, in the county of Middlesex, civil engineer, for improved apparatus for torrefying, baking, and roasting vegetable substances, which, with certain modifications and additions, is also applicable to the evaporation and concentration of saccharine juices and other liquids, being a communication from a foreigner residing abroad.—Sealed 13th June —6 months for inrolment.

To Alexander Ritchie, of Leeds, in the county of York, merchant, for a certain improvement in dressing and finishing woollen cloths, and other woven fabrics, being a communication from a foreigner residing abroad. —Sealed 13th June—6 months for inrolment.

To Charles Schafhautl, of Dudley, in the county of Worcester, gentleman, for his invention of certain improved apparatus for puddling iron.—Sealed 13th June —6 months for inrolment.

To Thomas Vaux, of Woodford-bridge, in the parish of Woodford, in the county of Essex, land surveyor, for his invention of a certain mode of constructing and applying a revolving harrow for agricultural purposes. —Sealed 13th June—6 months for inrolment.

To John White, of the town and county of Southampton, engineer, for his invention of certain improvements on rotary steam-engines, which implements, or parts thereof, are applicable to other useful purposes.—Sealed 15th June—6 months for inrolment.

To James Dredge, of the parish of Walcot, in the city of Bath and county of Somerset, for his invention of certain improvements in the construction of suspension chains for bridges, viaducts, aqueducts, and other purposes, and in the construction of such bridges, viaducts, or aqueducts.—Sealed 17th June—6 months for inrolment.

To John Hopkins, of Exmouth-street, Clerkenwell, in the county of Middlesex, surveyor, for his invention of improvements in furnaces for steam-engine boilers and other purposes.—Sealed 18th June—6 months for inrolment.

To Louis Gachet, of Cambridge-heath, in the county of Middlesex, gentleman, for his invention of improvements in machinery for manufacturing and producing velvets and certain other fabrics.—Sealed 18th June—6 months for inrolment.

To Joseph Bunnett, of Newington-causeway, in the borough of Southwark, window-blind maker, for his invention of certain improvements in window shutters, which improvements may also be applied to other useful purposes.—Sealed 18th June—6 months for inrolment.

To William Watson, of Liverpool, in the county palatine of Lancaster, merchant, for certain improve-

ments in the manufacturing of sugars from beet-root and other substances, being a communication from a foreigner residing abroad.—Sealed 18th June—6 months for inrolment.

To John Young, of Wolverhampton, in the county ot Stafford, patent lock-smith, for his invention of certain improvements in manufacturing boxes and pulleys for window sashes and other purposes.—Sealed 21st June —6 months for inrolment.

To Robert Smith, of Manchester, in the county of Lancaster, engineer, for his invention of certain improvements in the means of connecting metallic plates for the construction of boilers and other purposes,—Sealed 22nd June—6 months for inrolment.

To William Wright, of Salford, in the county of Lancaster, machine maker, for his invention of certain improvements in twisting machinery, used in the preparation, spinning, or twisting of cotton, flax, silk, wool, hemp, and other fibrous substances.—Sealed 22nd June —6 months for inrolment.

To Charles Pearce Chapman, of Cornhill, in the city of London, zinc manufacturer, for his invention of improvements in printing silks, calicoes, and other fabrics.—Sealed 22nd June—6 months for inrolment.

To William Barratt, of Brighton, in the county of Sussex, founder, for his invention of certain improvements in apparatus for generating and purifying gas for the purposes of illumination.—Sealed 22nd June—6 months for inrolment.

To Hamer Stansfeld, of Leeds, in the county of York, merchant, for improvements in machinery for preparing certain threads or yarns, and for weaving certain fabrics.—Sealed 22nd June—6 months for inrolment.

To John Woolrich, of Birmingham, in the county of Warwick, professor of chemistry in the Royal School of Medicine at Birmingham, for his invention of certain improvements in producing or making the substance

commonly called or known by the name of carbonate of baryta or carbonate of barytes.—Sealed 22nd June—6 months for inrolment.

To Henry Dunnington, of Nottingham, lace manufacturer, for his invention of certain improvements in making or manufacturing lace.—Sealed 22nd June—6 months for inrolment.

To John McDowall, of Johnstone, in the county of Renfrew, North Britain, and of Manchester, in the county of Lancaster, engineer, for his invention of certain improvements in the machinery for sawing timber, and in the mode of applying power to the same.—Sealed 24th June—6 months for inrolment.

To George Richards Elkington, of Birmingham, in the county of Warwick, gilt toy maker, for his invention of an improved method of gilding copper, brass, and other metals or alloy of metals.—Sealed 24th June—6 months for inrolment.

To Samuel Hall, of Basford, in the county of Nottingham, gentleman, for his invention of improvements in propelling vessels; also improvements in steam-engines, and in the method or methods of working some parts thereof, some of which improvements are applicable to other useful purposes.—Sealed 24th June—6 months for inrolment.

To Alexander Stocker, of Birmingham, in the county of Warwick, gentleman, for his invention of improvements in machinery for making files.—Sealed 25th June—6 months for inrolment.

CELESTIAL PHENOMENA, for July, 1836.

D.	H.	M.	
1			Clock before the ☉ 3m. 27s.
—			☽ rises 10h. 51m. A.
—			☽ passes mer. 2h. 17m. A.
—			☽ sets 6h. 20m. M.
2	4	28	♅ in conj. with the ☽ diff. of dec. 4. 30. N.
	10	3	♄ stationary.
	11	46	♀ stationary.
	15		☉ in Apogee.
5			Clock before the ☉ 4m. 11s.
—			☽ rises 11h. 52m. A.
—			☽ passes mer. 5h. 39m. M.
—			☽ sets 11h. 54m. M.
	5	36	☽ in □ or last quarter.
7	17	48	☿ stationary.
—			Occul. σ in Arietis, im. 12h. 48m., em. 13h. 39m.
9	5	44	♂ in conj. with the ☽ diff. of dec. 1. 39. S.
	12	39	☿ greatest Hel. Lat. S.
10			Clock before the ☉ 4m. 58s.
—			☽ rises 0h. 58m. M.
—			☽ passes mer. 9h. 20m. M.
—			☽ sets 5h. 55m. A.
11	11		☽ in Apogee.
	16	54	☿ in conj. with the ☽ diff. of dec. 7. 17. S.
13	8	49	Ecliptic conj. or ● new moon.
	16	27	♃ in conj. with the ☽ diff. of dec. 4. 23. S.
14	15	8	♀ in conj. with the ☽ diff. of dec. 9. 21. S.
15			Mercury R. A. 6h. 14m. dec. 20. 17. N.
—			Venus R. A. 8h. 40m. dec. 14. 2. N.
—			Mars R. A. 14h. 17m. dec. 21. 4. N.
—			Vesta R. A. 12h. 34m. dec. 3. 29. N.
—			Juno R. A. 9h. 42m. dec. 10. 59. N
—			Pallas R. A. 21h. 22m. dec. 14. 55. N.
—			Ceres R. A. 23h. 54m. dec. 14. 54. S.

D.	H.	M.	
15			Jupiter R. A. 7h. 53m. dec. 21. 15. N.
—			Saturn R. A. 13h. 50m. dec. 8. 43. S.
—			Georg. R. A. 22h. 25m. dec. 10. 47. S.
—			☿ passes mer. 22h. 40m.
—			♀ passes mer. 1h. 6m.
—			♂ passes mer. 20h. 43m.
—			♃ passes mer. 0h. 20m.
—			Clock before the ☉ 5m. 35s.
—			☽ rises 5h. 6m. M.
—			☽ passes mer. 1h. 29m. A.
—			☽ sets 9h. 37m. A.
18	11	46	☿ Greatest elong. 20. 6. W.
19	14	11	♃ in conj. with the ☉
20			Clock before the ☉ 5m. 59s.
—			☽ rises 11h. 17m. M.
—			☽ passes mer. 5h. 11m. A.
—			☽ sets 10h. 51m. A.
21	3	51	♄ in conj. with the ☽ diff. of dec. 0. 57. N.
	3	5	☽ in □ or first quarter.
	5	36	♄ in □ with the ☉
23			Occul. δ in Scorpii., im. 9h. 1m., em. 9h. 59m.
25	12	39	♀ in inf. conj. with the ☉
—			Clock before the ☉ 6m. 10s.
—			☽ rises 6h. 17m. A.
—			☽ passes mer. 9h. 45m. A.
—			☽ sets 0h. 20m. M.
26	13		☽ in Perigee.
28	5	47	Ecliptic oppo. or ○ full moon.
	12	11	☿ in the ascending node.
	21	5	♀ in conj. with ♃ diff. of dec. 7. 19. S.
29	10	57	♀ in Aphelion.
	13	19	♅ in conj. with the ☽ diff. of dec. 4. 20. N.
30			Clock before the ☉ 6m. 5s.
—			☽ rises 9h. 35m. A.
—			☽ passes mer. 1h. 54m. M.
—			☽ sets 6h. 48m. M.

The Eclipses of the Satellites of Jupiter are not visible this month, Jupiter being too near the Sun.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR MAY AND JUNE, 1836.

1836.	Thermo.		Barometer.		Rain in inches.	1836.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low.	
May						June					
26	61	36	30,24	30,20		10	69	53	29,79	29,74	-
27	63	31	30,31	30,29		11	67	53	29,78	29,71	,175
28	64	31	30,31	30,26		12	69	43	30,13	29,97	
29	69	41	30,26	30,24		13	73	44	30,21	30,17	
30	69	36	30,22	30,13		14	76	51	30,17	30,05	
31	69	42	30,06	29,94		15	79	45	29,90	29,79	
June						16	72	56	29,85	29,84	
1	65	44	29,89	29,85	,02	17	74	50	29,85	29,78	,375
2	64	44	29,73	29,59		18	69	47	29,74	29,56	,025
3	68	47	29,57	29,56	,17	19	65	48	29,75	29,56	,35
4	66	50	29,55	29,53		20	63	47	29,93	29,90	
5	57	44	29,81	29,63	,15	21	65	47	29,93	29,90	
6	65	41	29,95	29,92		22	62	52	29,86	29,82	,1
7	60	47	29,88	29,71		23	68	53	29,76	29,74	,075
8	69	49	29,61	29,57	,075	24	69	51	29,74	29,69	,125
9	66	49	29,73	29,65		25	64	47	30,02	29,92	

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

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No. LIII.

Recent Patents.

To JOHN HEATHCOAT, *of Tiverton, in the county of Devon, Esq., for his invention of certain new and improved methods of draining and cultivating land, and new or improved machinery and apparatus applicable thereto; which machinery and apparatus may be applied to divers other useful purposes.*—[Sealed 15th May, 1832.]

THE subject of this patent is, in a national point of view, particularly as regards Ireland, one of the most important that has been introduced to the public. It is principally designed to afford the means of cultivating such boggy waste lands as are of too spongy a character to sustain the feet of horses.

The apparatus consists principally of a locomotive steam-engine sustained upon a platform, which moves very slowly over the surface of the bog, upon a very

broad endless band, which is nearly impervious to water, and presents such an extended surface as to prevent its sinking. From this machine ploughs and other implements of husbandry for cutting and turning over the surface of the moss are worked out and in, to the distance of a quarter of a mile on each side at right angles to the course in which the engine is slowly advancing, and the power of the steam impels the ploughs in place of horse or other manual labour.

Upon the merits of this invention and its important advantages volumes might be written, and no doubt will be; but our limit at present only allow us to give the details of the contrivances as set out in the specification, observing, however, that we have withheld our report under the expectation of being enabled to speak practically of the effect of its operation.

We have several times within the last two years witnessed the action of the machinery upon Red Moss, near Bolton-le-Moors, in Lancashire, under the superintendence of a skilful engineer, Mr. Josiah Parks, and have now the satisfaction of communicating to our readers the fact of its most unqualified success.

The new or improved methods of draining and cultivating land, consists in the employment of certain machinery and apparatus to be worked by steam or other power, for the purpose of ploughing, cutting, rolling, harrowing, trenching, and draining lands, and for effecting other operations of husbandry as are or may be performed by traction, which machinery and apparatus is particularly adapted for use on lands which cannot be so conveniently worked and tilled in the ordinary manner by the agency of horses or other cattle.

This machinery or apparatus consists of a carriage with a steam-engine, or other motive engine mounted thereon; and also of auxiliary machines or apparatus, supporting and conducting extended ropes, bands, or chains, at a distance from the motive engine.

The power of the engine is designed to draw ploughs and other agricultural implements to and fro, between the principal and auxiliary carriages at right angles, or any other convenient angles, and also to give locomotion to the principal carriage in which the engine is mounted.

In order to render my methods more evident, I shall proceed to describe the general features of my machinery or apparatus, with the objects they are intended to effect, and some of the variations and modifications of which they are susceptible.

First, I employ a carriage of large dimensions, designed for the support of a steam-engine, or other machinery, capable of generating or communicating motive power; this carriage is mounted on a series of wheels, which conduct an endless flexible floor railroad or way, within and upon which the carriage travels.

The endless flexible floor, rail-road, or way, affords an extremely broad and extended surface, for the purpose of sustaining a carriage of great weight upon soft, swampy, boggy, or unstable land.

Secondly, in place of the series of wheels and broad flexible endless floor, rail-road, or way, I substitute, in certain cases, rollers or drums, presenting considerable surfaces to the ground; I employ carriages mounted on such broad rollers or drums on lands or soils which naturally possess or have acquired sufficient solidity to sustain their weight.

Thirdly, I modify the carriage by mounting it upon wheels suitable for travelling on land of a sufficiently firm and compact nature, in order to simplify the application of the machinery and apparatus to the culture of such soils.

Fourthly, I employ auxiliary carriages, which I place on each side of the principal carriage, at a distance from and parallel therewith, and by means of ropes, bands, chains, or other media of traction, issuing from and actuated by the machinery of the principal carriage; and passing round a wheel, pulley, or barrel, on the auxiliary carriages, I drag the ploughs or other agricultural implements to and fro between the said principal carriage and auxiliary carriages at right angles, or at any other convenient angles, to the line of progress of the principal carriage. By these means, a wide extent of land is brought under operation by my machinery and apparatus.

These auxiliary carriages are mounted on wheels, rollers, drums, or flexible floors, railroads, or ways, similar to those provided for the principal carriage, and suitable to various soils, by which means they are capable of being made to advance or retrograde as circumstances may require.

Upon the platform of the principal carriage described under the first, second, and third heads, I fix a boiler and the several parts of a steam-engine or other actuating machinery, which, through the agency of wheels and suitable gearing, I employ for the purpose of giving locomotion to the carriage in its longitudinal direction, and also for driving the drums or barrels, that work the track ropes, bands, or chains, which draw the ploughs or other implements to and fro between the principal carriage and the auxiliary carriage.

In the accompanying drawings, see Plate XII., the same letters are used to denote similar parts in all the figures. Fig. 1, is a plan or horizontal view of the skeleton or frame of the principal carriage, showing twelve large wheels, *a, a, a,* and also twenty-four wheels, *b, b, b,* of smaller diameter, supporting the carriage. These wheels are fixed upon shafts lying transversely to the length of the carriage, the shafts of the larger wheels being mounted on pedestals standing upon the upper beams or timbers, of which the framing of the carriage is constructed, and those of the smaller wheels turning in pedestals fixed on the lower beams of the framing.

Round the six wheels *a, a, a,* and under the twelve smaller wheels *b, b, b,* on each side of the carriage, an endless flexible floor is extended, the upper part being removed in this figure the better to show the parts; the weight of the upper part of these floors being sustained in the middle by wheels placed at suitable distances, to allow the iron plates of the endless floor, hereinafter described, to rest upon and pass over them, as shown in the side elevation of the locomotive engine at fig. 3, and which wheels are supported from the platform of the carriage.

This endless flexible floor *c, c, c,* I propose to make of painted or tarred sailcloth, which is stretched transversely by the bars of wood *d, d,* bolted at intervals to endless strips of sheet iron *e, e,* upon which strips or bands of iron the wheels run.

The heads of the bolts by which the stretchers are connected with the iron bands (excepting those which would come in contact with the teeth of the spire wheels *m,* and *n,*) are made so long as to project inwards about two inches; the space between the heads of

each pair of bolts is somewhat greater than the width of the rims of the wheels, and the insides of the heads are bevelled in order to allow the wheels to enter more freely between them. Thus the bolts serve not only to unite the several parts of the flexible floors, (that is to say) the endless iron bands and transverse wood stretchers with the sailcloth held firmly between them, but also to keep the iron bands in the tracks of the wheels.

In some cases I propose to dispense with the sail-cloth, and in lieu thereof to use a greater number of wooden stretchers, placed as near to each other as may be necessary, in order to bear the weight of the carriage, and prevent its sinking too deeply into the land or soil. The construction of the endless flexible floor is represented in several of the annexed figures.

Fig. 2, is a horizontal view of the locomotive carriage, exhibiting the platform or floor on which the boiler, the engine, the gearing, and other machinery, are fixed.

In the side elevation, fig. 3, the boiler and one of the steam-engines, with its appendages, is exhibited; and in fig. 4, which is also a side elevation, the mode of mounting and driving one of the track rope barrels only is represented. Fig. 5, is an end view of the locomotive carriage and engine, exhibiting the endless flexible floors passing over the wheels.

The auxiliary carriage is shown in a plan or horizontal view at fig. 6, and in side elevation at fig. 7. It is mounted on broad rims or rollers, and exhibits the wheel or pulley round which the cord is passed from the principal carriage.

Fig. 8, is a plan or field view, upon a very minute scale, of the relative position of the principal and

auxiliary carriages, as they are to be employed, together with the manner in which the power of the engine is communicated to the ploughs or other implements, through the agency of the track ropes, bands, or chains.

I intend, wherever the surface of the land operated upon shall permit, to make drains on each side of the track of the carriages, as represented in fig. 8, which drains will serve the double purpose of laying dry the roadways on which the carriages travel, and of receiving and discharging the water issuing from the drains which may require to be made between the parallel roadways of the principal and auxiliary carriages. These drains, being at right angles to the roadways, may be formed in part by the traction of draining ploughs, or other suitable implements of drainage, by the steam-engine, and their intersections with the roadway drains may be completed by hand labour. I also intend to lay down these roadways in grass or herbage, which will be benefitted, rather than injured, by the passage of the carriages over its surface. This application of my invention is more particularly suitable to bogs and mosses, which, from their extent, will admit of being laid on a plan of parallel roadways at given distances, crossed at right angles by similar roadways. These arrangements will prevent the expense of constructing hard stone roads: no land will be lost, as I contemplate that the cultivation, by my machinery and apparatus, of such lands, will be more economical and convenient than the employment of horses and other cattle, even after they shall have acquired sufficient solidity to bear horses or other cattle, and carriages of the ordinary description.

The steam-engine, which I deem most convenient for

the purposes of this invention, is constructed upon the high-pressure principle, with two horizontal cylinders, which, through their connecting rods, give motion to the crank shaft.

The steam whereby the pistons are worked is generated in a boiler A, and passes from thence through pipes B, B, to the induction valves and cylinders C, C, which are furnished with suitable valves, and the eduction steam is discharged from the cylinders after each stroke by the pipes D, D, into the chimney E, E. The boiler is supplied with water by the force pumps F, F, worked by rods attached to the slides of the piston rods. The power of the engine is communicated to the machinery by which the carriage is moved, and also to the machinery designed to work the ploughs and other apparatus for draining and tilling the land, through the agency of the crank shaft *f*.

On the crank shaft *f*, there is a sliding pinion *g*, which, when thrown into gear with the wheel *h*, gives rotary motion to the train of wheels and pinions *h, i, k, l*; by which means the large spur wheel *m*, fixed on the shaft of the wheels *a, a*, will be driven round, and with it the wheels *a, a*, also.

Upon an elongation of the shaft of the pinion *l*, (which is broken off in the drawing, fig. 2, to avoid confusion, but shown by dots,) a similar pinion is fixed, which takes into the other spur wheel *n*; and, consequently, with the wheels *a, a*, connected thereto, the endless floors or bands will be made to revolve simultaneously. Thus, by the connexion of the sliding pinion *g*, the carriage supporting the steam-engine and other machinery is, when required, made locomotive.

At each extremity of the crank shaft *f*, there is a small spur pinion *o, o*, in gear with the wheels *p, p*,

fixed on the counter shaft *q*, *q*. These counter shafts each carry a pair of mitre wheels turning loosely thereon, which take into the teeth of a similar mitre wheel fixed on the end of the axle of each of the drums or barrels *r*, *r*. To these barrels track ropes, bands, or chains, are attached, for the purpose of drawing the ploughs, or other implements, to and fro between the principal and auxiliary carriages.

A clutch box *s*, slides upon each of the counter shafts between the mitre wheels; and when either of the barrels are to be put into operation, the clutch box must be slidden so as to lock it into one of the mitre wheels, which causes the barrel, by its rotation, to wind or coil the extended rope or chain, and draw the plough, or other implements attached thereto, over the ground. Of course it will be seen that the rotation of the barrels may be reversed by sliding the clutches into the opposite mitre wheels.

In order to work the ploughs or other implements, I first place the auxiliary carriages at convenient distances from the principal or locomotive carriage, and parallel therewith, as shown in fig. 8, and then make fast one end of a rope, band, or chain, to each of the barrels *r*, *r*, on the locomotive carriage. I then coil thereon a quantity of the rope, band, or chain, sufficient, when uncoiled, to extend from the principal to the auxiliary carriages. I then stretch out a continuation of such ropes, bands, or chains, to, and pass them round the pulleys or drums *t*, on the auxiliary carriages, bringing the ends back to the main carriage, and there make them fast to the barrels *r*, in such a way that when the barrels revolve, the rope, band, or chain, may travel round the pulleys of the auxiliary carriages, one end of the ropes,

bands, or chains, coiling on the barrels *r*, whilst the other ends are uncoiling therefrom.

To these track ropes, bands, or chains, I attach ploughs, or other agricultural implements, and then (the steam-engine being at work) I throw the barrels *r*, into gear by means of the clutch boxes *s*, *s*, which will cause the ropes, bands, or chains, to travel over the spaces of ground between the main carriage, and the auxiliary carriages drawing the ploughs or other implements through or over the ground in the line or space comprised between the principal and auxiliary carriages.

When the plough or other implement shall have been drawn out to the required distance, it may be turned round by an attendant at the auxiliary carriage, and the barrel *r*, be made to revolve in an opposite direction, so as to cause the plough or other implement to be drawn back again towards the principal carriage.

It is evident that the train of wheels and pinions may be so arranged as to cause the carriage to be advanced or retrograded through a space equal to the width of the land operated upon, and completed by the plough, roller, harrow, or other implement, during the time occupied in the passage of such implement between the principal and auxiliary carriages. Or the principal carriage may rest, during the time of performing such operations, and be put in motion at required intervals, by throwing the pinion *g*, on the crank shaft *f*, into and out of gear, with suitable trains of wheels.

The auxiliary carriages must be advanced or retrograded at rates corresponding with the progress of the principal carriage, whether the latter be moved continuously or at intervals: this may be effected through

the pinion *u*, shown in the plan or horizontal view, fig. 6, which pinion takes into the teeth of a wheel *v*, on the axle bearing the broad rollers or drums *w*, *w*; and by turning the axle of the pinion by a hand spike *x*, the carriage will be moved.

Another obvious mode of communicating motion, and one capable of giving various speeds to the auxiliary carriage, is the employment of a train of wheels and pinions, actuated by winches, gearing into the spur wheel on the shafts, bearing the two drums or rollers. The auxiliary carriages must be sufficiently heavy to resist the drag or force exerted upon the cord, when the plough or other implement is drawn from the principal carriage towards it. In cases when a very great power may require to be exerted, the auxiliary carriage must be weighted accordingly; or it may occasionally be made fast to stakes fixed at proper distances in the soil by a cord or chain, so as to oppose the greatest resistance to the pull of the track rope: in other cases, where operations may have to be performed at considerable intervals or distances, the one from the other, and draining ploughs or other implements requiring great force may have to be used, the pulley, round which the cord passes from the principal carriage, may be attached to stakes or posts driven in the soil at proper distances, or a portable crane may be employed for this purpose.

I do not claim as any part of my invention, the particular construction of the steam-engine delineated. I have adopted it, as well suited for impelling the carriage, and for accomplishing the various objects of my invention; but other forms of engines, as well as other agents than steam, may be applicable as a motive force.

Upon mosses or bog lands, where coal or other fuel

may be too expensive, or too difficult to obtain, I propose to use peat to work the engine; in which case, it will be necessary to make the furnace or fire-box of the boiler sufficiently capacious, for containing such a quantity of this bulky kind of fuel as will produce the requisite abundance and force of steam; and as, in such situation, water is at most times procurable from the drains, I propose to supply the boiler either directly from the drains, or from holes formed at convenient distances, by attaching a hose to the pipe of the pump.

I do not intend to confine myself to the precise material or construction, arrangement or dimensions, of the parts of the principal carriage, or auxiliary carriage or carriages, or to the distances at which such carriages are placed asunder, as shown in these drawings; nor to the manner in which the engine is combined with them. I propose, in some cases, to make use of a carriage having only one endless flexible floor, railroad, or way; and to place the engine on such carriage, instead of placing it between two endless flexible floors, as hereinbefore described; in which case, it will be necessary to pass the chimney in a horizontal direction, in order to clear the edge of the upper part of the endless flexible floor, whence it may be raised vertically to the required height.

I propose also to employ a modification of the carriage mounted on broad rollers or drums, and impelled by a steam or other engine, and serving as a heavy rolling machine, in order to consolidate the soil, or to break down lumps or clods.

I sometimes employ a carriage mounted on three broad rollers or drums, furnished with a steam-engine of small dimensions and compact form, as represented in figs. 9, and 10. The power is to be communicated

by suitable gearing to the two drums, and the machine may be directed into a new path, and be made to travel over fresh ground, after having reached the end of an enclosure or field, by turning the axis of the single drum at an angle to the axis of the two rollers or drums, by means of a rack and pinion acting on the bearing of one end of the axis, the other end being mounted in an adjustable bearing, as shown at fig. 10. The motion of the engine must then be reversed, and one of the two rollers or drums be disengaged from the engine, and allowed to turn freely upon its axis; while the other is locked into the gearing of the engine, and turned round by it. In this manner the machine may be made to take up fresh ground, without being turned completely round. This machine may also be employed to drag ploughs or other agricultural implements, in connexion with auxiliary carriages, by adapting to it barrels fixed and worked in a manner similar to those already described: for this purpose, it may be necessary to apply a wheel in each side of the single roller, in order to give sufficient stability to the carriage. These wheels are shown, dotted in fig. 10, as also the barrels. The wheels are mounted upon temporary axles bolted to the framing, so as to be removed at pleasure.

The wheels, *a*, *a*, *a*, of the principal carriage, are represented as formed of wooden spokes and fellies, with naves of cast iron; but I propose to make them stronger, in cases where the weight of the carriage and engines may require it, by filling in between the spokes with wood, so as to form complete discs; or it may be still more advantageous to employ wheels of cast or wrought iron.

In case the wheels should have a tendency to slip round within the endless floor without carrying it with

them, then the two inner straps of iron *e*, *e*, may be made with teeth or cogs fastened upon them at proper intervals, which shall take into the spaces of the wheels *m*, *n*.

I have now described my new or improved methods of draining or cultivating land, and have shown the manner in which the machinery and apparatus are to be applied to the culture of various soils. I have before stated this invention to be especially serviceable on lands which cannot be so conveniently worked and tilled in the ordinary manner by the agency of horses and other cattle. The cultivation of bogs or mosses, require more numerous drains than drier and firmer ground; and when horses or other cattle are employed, it is necessary that most of the drains should be covered, in order to enable the horses or other cattle to pass over them; but by the system of cultivation by traction obtained from motive power, combined with the arrangement of the principal and auxiliary carriages hereinbefore explained, I am enabled not only to drain, plough, roll, and work the soil by suitable implements, without its being poached or injured by the feet of horses or other cattle; and also to leave the drains open, by which they may be cleansed and deepened, as the water shall subside and the land consolidate.

If, in the progress of these soils, boggy grounds become consolidated, all the original drains, which I propose to make very numerous, should no longer be necessary, a portion of them may be filled up; and of the remainder, such may be left open, and such covered, as circumstances of cultivation may require.

As regards the utility of this invention in a national point of view, I anticipate also that several advantages will result from the substitution of steam power for

horses and other cattle, and from the use of peat as fuel for the steam-engines to be employed in the culture of mosses or bog lands: amongst the advantages, will be the abundant and profitable engagement of an unemployed population in the raising and preparing of peat for feeding the steam-engines, and as labourers in reclaiming and cultivating lands which are at present utterly unproductive; and further, that the produce of the soil will be available as food for human beings, instead of being consumed by horses and other cattle employed in the cultivation.

It will be obvious, as the principal carriage hereinbefore described is capable of locomotion, and contains a steam or other engine of power, that it may be placed in convenient situations, where the power of such engines may be advantageously used for the working of corn mills, thrashing machines, chaff cutters, pumps, or other machinery.—[*Inrolled in the Rolls Chapel Office, November*, 1833.*]

Specification drawn by Messrs. Newton and Berry.

"During the Whitsuntide recess of Parliament, a numerous assemblage of gentlemen from different parts of the country attended to witness an exhibition of this novel and interesting invention; amongst whom were Mr. M. L. Chapman, M.P., Mr. T. Chapman, Mr. H. Handley, M.P., Mr. J. Featherstone, of Griffinstown-house, Westmeath (an enterprising and successful bog-reclaimer), Mr. F. Brown, of Welbourn, Lincolnshire, Mr. James Smith, of Deanston, near Stirling (well known to the mechanical world by his ingenious inven-

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* In this instance, eighteen months have been allowed for inrolling the specification.

tions, applied both to agriculture and manufactures), Mr. B. Hick, and Mr. P. Rothwell, engineers, with other experienced judges of mechanical contrivances. These gentlemen were unanimous in pronouncing the invention to be the germ of great improvements in the science and practice of agriculture, as well as eminently fitted for the particular purpose to which it has in the first instance, been applied. Two ploughs of different construction were put in action, to the admiration of the spectators; particularly the one last invented, which is double-acting, or made with two shares in the same plane, so that it returns at the end of a 'bout,' taking a new furrow, without loss of time. The perfect mechanism of this plough—the action of the working coulters and under-cutting knives, which divide every opposing fibre of the moss—the breadth and depth of the furrow turned over—the application of a new and admirable means of traction, instead of chains or ropes—together with the facility with which the machine is managed, and the power applied to the plough, especially interested and surprised all present. The speed at which the plough travelled was two miles and a half per hour, turning furrows eighteen inches broad by nine inches in depth, and completely reversing the surface. Each furrow of two hundred and twenty yards in length was performed in somewhat less than three minutes; so that in a working day of twelve hours this single machine would, with two ploughs, turn over ten acres of bog land.

The machine which bears the steam-engines is itself locomotive; but as the ploughs are moved at right angles to its line of progress, not dragged after it, the machine has to advance only the width of a furrow, viz. eighteen inches, whilst the ploughs have travelled

a quarter of a mile; in other words, the machine has to be moved only eleven yards in the time that the ploughs have travelled five and a half miles, and turned over a statute acre of land. This is, in truth, the prime distinguishing feature of the invention; it is the contrivance on which the genius of its author is more particularly stamped, and which seems to be essential to the economical application of steam to husbandry; for it is evident, that were it requisite to impel the machine with a velocity equal to that of the ploughs, by dragging them with it, a great proportion of the power of the engines would be uselessly expended.

Another valuable property appertaining to the machine, and which conduces greatly to its economy as a bog cultivator, is, that it requires no previous outlay in the formation of roads, no preparation of any kind, further than a drain on each side of it. That a locomotive machine of such great dimensions and power could be so constructed as to travel on mere raw bog, was an excellence the more appreciated, as it was unexpected by those persons who are conversant with the soft, unstable nature of bog. The Irish gentlemen present also pronounced Red Moss to be a fair specimen of the great mass of the flat, red, fibrous bogs of Ireland, and that neither the machine nor the ploughs would have any difficulties to encounter in that country, which had not been already overcome on Red Moss, the field of experiment. The engines are capable of working up to fifty horses power; but the operations subsequent to ploughing will require a small force compared with that necessary for breaking up the surface of the bogs, to the depth and at the speed effected by these ploughs. The power consumed by each plough is estimated at about twelve horses; and the weight of the sod

operated upon by the plough, from point to heel, is not less than three hundred pounds. The boiler is of unusually large dimensions for locomotive engines, being suited to the use of peat as fuel, so that the culture of a bog will be effected by the produce of its drains. At Red Moss, however, coals are so cheap, being found contiguous to and even under it, that they are used in preference to turf. Eight men are required for the management of the machine and the two ploughs, or at the rate of nearly one man per acre; but it must be understood that this number of men will only be required for the first heavy process, and has no relation to any subsequent operations in the cultivation of bogs, nor to the application of the invention to the culture of hard land.

After passing a sufficient time on the Moss to witness the exhibition of the ploughs, and the various other functions and properties of the machine, the party expressed to Mr. Heathcoat the extreme pleasure they had received, and their earnest hope that he would extend the sphere of his exertions by applying the invention to the culture of stiff clay soils; and more especially, to carry into effect those important operations of sub-soil ploughing and improved drainage recently introduced to the agricultural world by Mr. Smith, of Deanston. To effect these processes, great power is essential; and it was evident that Mr. Heathcoat's invention was equally well adapted to them, and would be attended with results no less important than those which will arise from its application to the reclamation and culture of bogs."

To William Lane, *of Stockport, in the county of Chester, cotton manufacturer, for his having invented certain improvements in machines, which are commonly known among cotton spinners by the names of roving frames, or otherwise called cone frames, or bobbin and fly frames, or jack frames.*—[Sealed 5th August, 1830.]

The Patentee states, in the commencement of his specification, that the main advantage proposed by this invention, is a diminution in the weight of the bobbins used in roving frames; to effect which, it is proposed to employ cylindrical bobbins having no flanges or projecting ends, and to wind the yarn on such bobbin in the form of a cylinder with conical ends, which will have the advantage of unwinding, in the future operations of spinning, with greater facility, and less liability of breaking the thread or yarn.

The cylindrical bobbin without ends is not claimed as new in its form, but in its adaptation to roving frames of the different descriptions mentioned above, and in conjunction with the mechanism for working them in those machines for the purpose of causing the yarns to wind on the bobbins in the form of cylinders with conical ends.

This mechanism is simply a mode of raising and lowering the copping rail of the machine, by what the Patentee calls tapering plates, that is, sliding wedges or inclined plains, or of reciprocating snail-cams, called by the Patentee spiral wheels, which are worked by a simple train of toothed wheels, connected to the ordinary rotatory parts of the machine.

In order to render this very obvious and trivial contrivance more evident, the specification sets out all the known methods of working the copping rails of such machines

which have been or are in common use, and indulges the reader with one of those learned treatises on the subject (covering twenty-one closely-written skins of parchment), to which we have too frequent occasion to allude, as incumbering the Chancery Rolls to the inconvenience of the public, and the mystification of the invention it purports to explain.

Allusion is made, in what the Patentee calls a postscript to his specification, to the part of Mr. Dyer's patent roving frame of 1825, which has a spring applied to the flyer, for the purpose of conducting and winding the yarns tightly upon the bobbins; and another form of spring is here suggested for the same object, but which the Patentee says he does not claim, as it is not his invention. For what purpose then was it inserted?—[*Inrolled in the Petty Bag Office, February,* 1831.]

To JOHN ERICSSON, *of the New-road, in the county of Middlesex, engineer, for his improved engine for communicating power for mechanical purposes.*—[Sealed 24th July, 1830.]

THIS invention is a steam wheel or rotary steam-engine: it consists of a tight circular box or chamber, within which another hollow circular box is intended to revolve. The outer box or chamber is made stationary, by being mounted upon a frame or standard. The inner box, called a fly drum, is fixed upon a revolving axle which extends through the former, its ends bearing upon anti-friction rollers. Three radial wings or partitions, as steam stops, are introduced within the rotary drum; but they are independent of it, being affixed to, and made stationary with, the outer box.

Plate XIII., fig. 3, represents a sectional elevation taken through the machine in the direction of its axis: *a, a, a,* is the box or outer chamber, into which steam is admitted by the pipe *b.* The box or chamber *a,* is made stationary, being fixed upon a base with end frame and standard. Through this chamber a shaft or axle *c,* is passed, bearing upon anti-friction rollers at its ends; and to this shaft *c,* the inner box, called the fly drum *d, d,* is attached by flanges. Three radial partitions or wings *e, e, e,* shown in fig. 4, are fixed upon a boss or collar *f,* and made stationary, by the collar being attached to the outer box, and the axle passing through it. The fly drum encloses these wings, but is enabled to revolve freely round them.

Steam being introduced into the external box *a,* it passes through slots or openings into the fly drum, and from thence escapes by an aperture near the axle into the exit chamber and eduction pipe *g, g.*

It is intended that the steam, when in the inner box, shall press against the stationary partitions or wings *e, e, e,* and also against inclined planes on the sides of the openings or induction apertures, by the force and resistance against which the fly drum is intended to be made to revolve, and, by the rotation of its shaft or axle, to communicate a power capable of driving other machinery.

The Patentee observes, "It will be seen that the wings *e, e,* must have notches or spaces cut in them, to allow the channels to pass by them in the course of the revolution of the fly drum. With reference to these channels, it is absolutely necessary to observe, that they must be so constructed, that the length of the channel shall always exceed its depth, in such proportion that the channel itself shall always move at a greater speed than the steam acting against its bottom; for when the length is to the depth as two for one, the

motion of the acting steam toward the bottom of the channel, will only be one-half as rapid as the motion of the channel itself."

It is unnecessary for us further to recite the Patentee's details and comments upon this invention, as it must be perfectly obvious in what way he proposes to obtain a moving power. We cannot, however, help remarking, that any means of packing the edges of the working parts (which constitutes the most difficult feature in all rotary steam-engines) is not once mentioned in this specification; and, upon the whole, the scheme is of so crude a character, that even its practicability (not to say any thing of its usefulness) appears extremely equivocal.—[*Inrolled in the Petty Bag Office, January*, 1831.]

To Lewis Aubrey, *of Two Waters, in the county of Herts, engineer, for his having invented certain improvements in cutting paper.*—[Sealed 1st November, 1830.]

One great objection to paper made in what are called Fourdrinier's perpetual machines, is the difficulty of cutting the lengths of paper into sheets. Several patents have been taken for mechanism to effect this object, that is, to cut the perpetual length of paper into small sheets of uniform dimensions, which mechanism has either been appended to the machine in which the paper was made, or the length of paper, after being dried, has been conducted through a separate machine for the purpose of being cut into sheets of the required size (see Cowper's patent, March, 1828, vol. viii. p. 20, of our Second Series).

The object of the present patent is the same as those

above alluded to, viz. for cutting great lengths of paper into small sheets. A frame supports several rollers, between which the long sheet of paper is conducted, and in its passage is cut lengthwise by a circular cutter, and crosswise by straight edges.

A large drum constitutes the bed or surface upon which the paper is extended and cut. Straight blades of steel are mounted upon the periphery of this drum in the direction of its axis at certain distances apart, for the purpose of cutting the long sheet of paper transversely, that is, crosswise, into short portions of given dimensions; while a circular cutter, turning vertically in the direction of the length of the sheet, slits it longitudinally, and hence separates the perpetual sheet, both in breadth and length, into small sheets.

As it will be required to produce sheets of paper of several sizes, according to the size or denomination required, the straight cutting blades must be shifted to a situation upon the periphery of the drum corresponding with the required dimensions. This is done by mounting the blades upon arms attached to the axle of the drum, and sliding their ends in segmental slots in the edges of the drum.

These straight blades being fixed upon the drum at the required distances apart, the perpetual sheet of paper is introduced between a pair of conducting or feeding rollers. Rotary motion is then given to the several rollers connected by gear, by which the paper is made to pass onward through the machine, and in its progress is slit or separated in width into strips by the one or more revolving circular cutters, which are by the same machinery actuated.

The paper is held tightly distended as it passes through the machine, by rollers covered with felt, which are made to revolve by gear; and the large drum is turned by the

friction of its contact with the paper and pressing rollers. When any one of the transverse cutting blades on the periphery of the cylinder is brought up into operation, the rotation of the rollers and drum are instantly suspended by their wheels being thrown out of gear, and an endless chain immediately put in motion for the purpose of conducting some small rollers across the machine, which, by pressing the paper down upon the edge of the blade, causes it to be cut transversely.

A portion of the paper having been thus separated from the long sheet or perpetual length, the machine then goes on as before until another of the straight blades comes up into operation, when its rotation is again suspended, and another transverse cut is produced, and so on until a sufficient length of the perpetual sheet has been cut up into the required quantity of small sheets.

The Patentee says, that he does not claim the individual parts of the machine, as they have been employed before; but he claims, first, the arrangement described, and, secondly, the rotary cutter for separating the sheet longitudinally. This rotary cutter, however, it will be seen by reference to Cowper's specification mentioned above, has been employed in a similar way before.—[*Inrolled in the Inrolment Office, May,* 1831.]

To JOHN HANSON, *of Huddersfield, in the county of York, plumber and brazier, for his invention of certain improvements on locomotive carriages.*—[Sealed 31st August, 1830.]

THIS invention applies not to the engines by which locomotion is produced, but to the wheels and axles of the car-

riages intended to be impelled upon railways, or on ordinary roads; and consists, first, in a mode of communicating the rotary power to the wheels, by means of endless chains; and secondly, in enabling the wheels to turn out of their straight course without shifting the positions of their axles.

Plate XIII., fig. 1, represents a portion of the side of a locomotive carriage, the running wheels being removed; *a, a,* is the frame of the carriage; *b,* the crank axle, which is made to revolve by the evolutions of the engine in the ordinary way. Upon the crank axle a spur wheel *c,* is mounted, the points or spurs of which take into the links of an endless chain *d, d.*

The axle of one of the pairs of running wheels is shown at *e,* confined laterally between the sides of a standard *f, f,* but allowed to rise and fall in the long slot or opening of the standard. One of the carriage springs is shown at *g,* bearing upon the axle of the running wheel; to the ends of which springs, rods are appended that support the frame *a, a,* and the machinery attached thereto; consequently, by the action of these springs *g,* the axle *e,* is enabled to play in the opening of the standard, and the carriage is relieved from jolts, occasioned by the wheels passing over inequalities or obstructions in the road.

On the axle of the running wheel *e,* a spur wheel *h,* is affixed, over which the endless chain *d, d,* passes; and hence, by the rotation of the crank shaft and spur wheel *c,* the endless chain *d,* is made to give rotary motion to the axle of the running wheel *e,* which causes the carriage to be impelled forward.

It is intended that two spur wheels *c,* of different diameters, shall be mounted upon the crank shaft *b,* each carrying an endless chain *d*; the one leading to the axle of the fore wheels of the carriage, the other to the hind wheels; so that both axles may be actuated by the rotation

of the crank shaft; and the wheels *c*, are locked to the crank shaft by clutches.

The second feature of the invention is shown at fig. 2, which represents a section of one of the running wheels, taken vertically through the nave: *i, i,* is the nave; *e, e,* the axle, formed conically, and terminating in a sphere at its ends. A flange *k,* is fixed at the outer end of the nave, and another flange *l, l,* at the inner end of the nave, for the purpose of confining the axle endwise; between which two flanges, the spherical end of the axle works as a ball and socket joint.

A pin or stud projecting from the upper part of the ball stands in a recess in the box or nave *i,* of the wheel; and consequently, as the axle revolves, the wheel is by the projecting pin forced round also; the perpendicular position of the wheel being preserved by a frame *m, m,* the vertical forked arms of which are attached to the nave.

The particular object of this construction of axle and nave is, that the wheels may be occasionally inclined out fo the straight direction of the carriage without changing the position of the axle, for the purpose of turning in the road or passing in curved tracks.

A horizontal arm extends from the forked frame *m*, of each of the running wheels, and which arms are connected by levers to the front of the carriage, where the steersman sits. These levers being therefore moved to the right or left, cause the running wheels to assume positions horizontally inclined to the axles, and hence, to conduct the carriage in the curved direction required. It will be perceived that the ball and socket connexion of the axle and the nave allows the wheel to turn in this way, and that the conical end of the axle turning in the conical recess of the flange *l,* affords the means of its free action.—[*Inrolled in the Inrolment Office, February,* 1831.]

To JOHN ERICSSON, *of Albany-street, Regent's-park, in the county of Middlesex, civil engineer, for his invention of an instrument for ascertaining the depth of water in seas and rivers.*—[Sealed 14th November, 1835.]

THE invention now before us, is what is commonly called a sea-gage, and one in which the principal difficulties that these gages are subject to are entirely removed. Some of these difficulties are, firstly, the establishment of a correct register, to point out the depth to which the sounding instrument has gone; little liable to be disarranged by accident, and which will not return to its former position when the pressure of the water is taken away. Another, is the graduation of the scales, as the degrees must diminish very rapidly when the instrument is at a considerable depth; and finally, the preservation of the instrument entire, whilst it is subjected to the enormous pressure of the water at a considerable depth, and which always proves so destructive to hollow instruments. The Patentee has, in a very ingenious and simple manner, effectually guarded against all these difficulties.

The invention is shown at fig. 5, Plate XIII., which represents a vertical section of the instrument, consisting of a glass tube *a*, open at both ends, and firmly fastened, by means of cement, in the cast iron tube *b*: *c*, is the graduated scale of fathoms; *d*, is an air chamber communicating with the external atmosphere by the short pipe *e*; *f*, is a crooked pipe, fastened on to the top of the glass tube *a*, and communicating with it.

When the instrument is to be brought into operation, the stopcock *g*, at the lower end of the glass tube, is closed, so as to stop up the end of the tube, and prevent the escape of the water. As the instrument goes down, the water presses upon the air in the short tube *e*, and compresses the air in the chamber *d*; and as the air is compressed,

the water rises in the chamber, and when it reaches the top of the bent tube *f*, it will run down into the glass tube *a*, and in this manner register the number of fathoms to which the instrument has gone. The use of the bent tube *f*, is to prevent the water, when it has once got into the glass tube, from returning into the air chamber *d*, except it is literally turned bottom upwards, which it is not very likely to be, though it may, by the current, be turned on one side. It will be evident, that the pressure of the water cannot have any destructive effect upon the instrument, as it is subject to the pressure of the air and water inside, and by that means the exterior pressure is neutralised. When the instrument is drawn up, the depth is ascertained by referring to the height of the water in the glass tube; the water is then let out of the glass tube by means of the stop cock *g*, and the instrument is again ready for use.—[*Inrolled in the Inrolment Office, May*, 1836.]

To Elias Carter, *of the city of Exeter, gentleman, for his invention of an improved apparatus for regulating the supply of gas to the burners, and for the stopping off the same, applicable also as a cock in drawing off or regulating the flow of other fluids.*—[Sealed 22d June, 1835.]

This invention consists in regulating or stopping the supply of gas to the burners, and is represented at Plate XIII. Fig. 6, is a longitudinal section of the apparatus, which must be screwed on to the pipe that supplies the burners: *a*, is the tube through which the gas must flow to supply the burners; *b*, is a partition, dividing the tube into two parts, and the gas must, to supply the burners, go over the top of the partition *b*, in

the direction of the arrow; and when it is desired to shut up the communication, the opening *c*, is closed by the piece of leather, or other flexible material *d*. This piece of leather *d*, is brought into contact with the top of the partition *b*, by means of the handle *e*, the reverse end of which is allowed to turn freely in a socket *f*; and by means of the screw on the upper part working in the top part of the conical chamber *h*, the leather is brought down upon the top of the partition *b*, and thus effectually closes the aperture *c*, and stops the communication.

The Patentee, in conclusion, remarks, that he usually casts the tube in one piece, but he does not consider it absolutely necessary; and he further remarks, that he does not confine himself to the use of leather as a flexible material for the purpose of closing the opening *c*; but what the Patentee claims as his invention, is the combination of the flexible valve *d*, with the pipe or tube *a*, for the purpose of regulating or stopping the supply of gas to the burner: this invention being also applicable to drawing or regulating the flow of liquids.—[*Inrolled in the Inrolment Office, December*, 1835.]

To Alexander Craig, *of St. Ann-street, St. Bernard's, in the parish of St. Cuthbert's, and county of Mid-Lothian, North Britain, in consequence of a communication made to him by a certain person residing abroad, for an invention of certain improvements in machines, or machinery, for cutting timber into veneers or other forms.* —[Sealed 20th October, 1830.]

The subject of this invention is a machine, containing circular saws, which it appears are intended to act against

the surface of a cylindrical log of wood, made to revolve slowly, for the purpose of cutting a thin veneer from the periphery of such cylindrical log. Any desired number of circular saws are to be mounted on horizontal axles in a wooden frame, which frame is enabled to slide to and fro in horizontal directions upon rollers. An endless band or strap is passed round pulleys on the axles of the circular saws, and round a rigger on the main driving shaft, by which the circular saws are made to revolve with great rapidity.

A rod, connected to the end of the circular saw frame, is attached to an excentric on the main driving shaft; and consequently, by the rotation of the driving shaft, the saws not only are made to revolve, but, with their carriage also, to slide to and fro. The cylindrical log of wood intended to be operated upon, is mounted in the machine upon centres fixed in a carriage, which keep it constantly pressed against the saws; and it is made to revolve slowly, by means of a spur or pointed roller pressed against its periphery by a weighted lever, this roller being connected by gear with the rotary parts of the machine.

It will now be perceived, that on giving rotary motion to the main shaft, the circular saws will not only be made to revolve, but that they will be also traversed to and fro longitudinally; and that the cylindrical log of wood, while it bears against the saws, will be made, by the spur roller, to turn slowly upon its centres, bringing the wood up to the saws as the veneer is severed from the periphery of the block by the traversing and revolving cutters.

There are many details connected with the machine, for the purposes of adjustment, which it will not be necessary to describe: indeed, many of the parts are so indistinctly represented, that we have found some difficulty in comprehending the whole of the Patentee's intention. Enough,

however, we trust, has been said to render the subject generally intelligible, as saw mills are tolerably well known.

A modification of the contrivance is given as a second feature of the invention, purporting to be for the purpose of cutting from square blocks, slices something thicker than what are usually called veneers. It consists of one small circular saw attached to the end of a shaft or spindle mounted in a frame, which slides vertically. The driving band passed from a pulley on the main shaft, and round a pulley on the shaft of the circular saw, and is kept tight by a tension roller. The saw sliding perpendicularly in its frame as it revolves, is intended to cut beyond its centre, but it does not appear to us in what way the veneer can possibly clear itself.

In conclusion, the Patentee says, "I claim as of my invention, first, applying circular saws having a rotary and reciprocating motion for the purpose of cutting veneers off the circumference of a revolving log of wood; and second, placing a small circular saw in a sliding frame, whereby a rotary and a reciprocating motion are given to such saw at the same time; thereby being enabled, in consequence of the saw moving from side to side of the log, to cut veneers off the surface of the log, according to the length given to the sliding or moving frame."—[*Inrolled in the Inrolment Office, April,* 1831.]

To CHARLES SHIELS, *of Liverpool, merchant, in consequence of a communication made to him by a foreigner residing abroad, for certain improvements in the process of preparing and cleansing rice.*—[Sealed 5th August, 1830.]

THE Patentee describes the ordinary mode of cleansing rice by first sifting it, to remove the dirt and defective

seeds, then passing it through a pair of mill-stones for the purpose of breaking the external coat or brown skin; next fanning it, to blow off the chaff or husks; and, lastly, throwing it upon an inclined wire screen, the meshes of which are finest at top, in order that the small defective grains may fall through into a receptacle placed to receive them, whilst the good grains run down, and are delivered at the lower part of the screen.

After the rice has undergone this preparation, the improved process commences, which consists in again passing the grains through a mill, for the purpose of rubbing off another coating or skin which grows within the external one.

The mill is to have a hard, firm bed-stone, but the runner is to be of wood, and the face of the runner to be covered with a sheep-skin, having the wool upon it. The woolly side of the skin is to be placed next the face of the runner, in order that an elastic pressure, as of a cushion, may be applied to the grain when the runner is revolving, which will cause the elastic skin to rub the surface of the grain so that the inner shells, or their husks, will be effectually rubbed off without breaking the grain.—[*Inrolled in the Petty Bag Office, February,* 1831.]

To Joseph Budworth Sharp, *of Hampstead, in the county of Middlesex, Esq., and* William Fawcett, *of Liverpool, in the county palatine of Lancaster, civil engineer, for their invention of an improved mode of introducing air into fluids, for the purpose of evaporation.* —[Sealed 20th October, 1830.]

It has been found, that by passing currents of air through heated fluids, evaporation may be greatly facilitated. Se-

veral patents have been obtained for different modes of doing this, particularly in reference to the crystallisation of sugar and salt. The invention before us is one of these contrivances, and consists in impelling air through the fluid by centrifugal force.

The material to be evaporated being placed in a pan or boiler as usual, a perpendicular pipe, mounted in suitable framework, is inserted into the pan. This pipe expands at bottom into branches, which are either perforated with holes, or opened by slits near their extremities, and being made to revolve rapidly while immersed in the fluid, the centrifugal force causes a partial vacuum to be produced at the end of each of the branches; to restore which, the air rushes with considerable force down the pipe, and thus a constant and rapid current of air is discharged into, and consequently made to pass through the fluid.

It will, of course, be understood that this mode of conducting the air by centrifugal force, constituting the sole matter of invention, the effect may be produced by any convenient arrangement of machinery suited to giving the rapid rotary motion to the air pipe and branches; and that it may be furnished with proper adjustments for regulating the operation according to circumstances.—[*Inrolled in the Inrolment Office, April,* 1831.]

To JAMES CHERRY, *of the city of Coventry, painter, carver and gilder, for certain improvements on bedsteads or apparatus applicable for the ease and comfort of invalids and others.*—[Sealed 15th January, 1835.]

THIS invention consists in certain arrangements of jointed parts and machinery attached to bedsteads, by

which greater ease and comfort is imparted to the body when in a recumbent posture, and by means of which machinery the body may be placed in various positions with little trouble and inconvenience.

The means proposed for effecting this will be better understood by reference to figs. 7, 8, 9, in Plate XIII. Fig. 7, represents a longitudinal section of a bedstead with the improvements attached thereto: *a*, is the frame; *b*, is the moveable couch, which may be shifted into the position shown in dotted lines, by means of the quadrants *c*, and *d*. The way in which this is effected is by turning the roller *e*, connected with the quadrant *c*, by a strap; and when this roller is made to revolve, it raises that part of the bed on which the upper part of the body rests, into the position represented in dots. The roller *f*, which is connected to the other quadrant *d*, is then turned, and is for the purpose of raising that part of the couch which supports the legs of the patient, into the position shown by dots.

If it is required to raise the invalid into a sitting posture, the couch, which turns upon a hinge *g*, as its fulcrum, may be altogether elevated into the position represented in fig. 8, by means of another quadrant *h*.

Fig. 9, is a transverse section of the bedstead, showing the mode of stretching the sacking, which is extended over the rollers *i*, and *j*, and by that means forms a sort of spring bed. This sacking may be loosened or tightened by turning the rollers which have a winch affixed to the end of each, and a ratchet and pall to prevent them from returning.

The Patentee, in conclusion, remarks, that he does not claim any of the parts separately, and that he does not confine himself to the use of any particular materials of

which the parts may be constructed, but he claims the arrangement of the apparatus applied to a new and specific purpose as set forth.—[*Inrolled in the Inrolment Office, July*, 1835.]

To THOMAS BRAMLEY, *gentleman, and* ROBERT PARKER, *Lieutenant in the Royal Navy, both of Mousley Priory, in the county of Surrey, for their having invented certain improvements on locomotive and other carriages, or machines applicable to rail and other roads; which improvements, or parts thereof, are also applicable to moving bodies on water, and working other machinery.*—[Sealed 4th November, 1830.]

THE specification of this patent exhibits a new edition of some of the most absurd, old, and exploded schemes that have been devised for obtaining and communicating power for the purposes of locomotion.

The first contrivance which is proposed to be applied to impelling carriages on railways, consists in placing a horse upon two tread-wheels or drums having raised ledges or ribs on their peripheries, against which the fore and hind feet of the horse are intended to press when in the act of stepping, so as to give rotary motion to the drums by the weight of his body, and from thence through trains of toothed wheels to the running wheels; at the same time, the horse being harnessed to the sides of the frame or cage in which the tread-wheels are mounted, he is intended to exert his muscular strength to aid in impelling the machine forward.

The second project is placing a man in a horizontal position in the carriage, supported by his body bearing

upon a rest; his feet are connected to stirrups, and his legs being put in motion, as in the act of swimming, he communicates a reciprocating movement, which, through rods and cranks, becomes rotary at the running wheels, and is, by that means, intended to propel the carriage by his feet, whilst his hands are employed in directing the steering apparatus in front.

The third scheme embodies the preceding; and in addition to the man exerting himself in a horizontal position, another man in a vertical position assists the propelling power by stepping upon treadles, which are also connected by rods and cranks to the axles of the running wheels.

The fourth feature of invention is a mode of attaching carriage wheels to their axles by means of a collar placed behind a shoulder upon the axle, when the collar, being affixed by screws to the inner end of the nave, secures the wheel upon the axle. In what way this differs from the ordinary mode of constructing what are called mail boxes, we do not perceive.

The fifth suggestion is to make the spokes of the running wheels expand and contract, by forming each of them in two parts connected by a socket and piston, which two parts are held together by a helical spring. The felloe or periphery of the wheel being made slightly elastic, the spokes are intended to contract or expand, and this is expected to assist the progress of the carriage when passing over unequal roads.

That two gentlemen as the Patentees, perhaps totally unacquainted with either theoretical or practical mechanics, should conceive impractical and even absurd schemes, is not a matter that can excite surprise; but that a professional man should be found, calling himself

civil engineer, so regardless of reputation as to advise the specifying of such projects as the above, and illustrate them by five elaborate sheets of drawing, with an explanatory detail extending over thirteen closely written skins of parchment, is really astonishing!—[*Inrolled in the Inrolment Office, May*, 1831.]

In examining the List of Patents granted since the beginning of the year 1830, we find that a few have escaped us, and have not yet been reported in the pages of our Journal. We hasten to correct this omission, which will explain the reason for inserting several in the present number which should have appeared earlier.—ED.

BILL FOR REGULATING TOLLS PAYABLE BY STEAM-CARRIAGES.

Our attention has been drawn to a Bill, now before Parliament, purporting to be an enactment for regulating the tolls payable by steam-carriages on passing along turnpike roads; but which very improperly contains clauses relative to the construction of steam-carriages, which, if allowed to become the law of the land, will preclude the use of steam-carriages on ordinary roads altogether.

Without entering into a discussion of the motives, prompted as we conceive by private interest, which has induced the introduction of these clauses, and the hasty manner in which the Bill has been smuggled through the House of Commons, we shall merely lay before our readers the fifth clause of the proposed enactments:—

"And be it further enacted, that it shall not be lawful to use any vessel or vessels for raising or generating steam to propel any

carriage along a public street or road, any part of the transverse section of which shall exceed *ten inches* in diameter in any direction, if circular or cylindrical; and if such vessel or vessels shall be made of any other figure than cylindrical, then no part of the transverse section or sides shall exceed *eight inches* in any direction, under a penalty for every breach of such regulation of not exceeding one hundred pounds, or less than twenty pounds."

We should be glad to know what construction of boiler, capable of generating a sufficient supply of steam for the purposes of locomotion, could be comprised within these dimensions?

The Bill is now before the Lords in Committee (the Marquis of Salisbury, chairman), where we trust that our own exertions to amend these errors, will be seconded by those whom it may more particularly concern.

AMENDMENT OF THE PATENT LAWS.

A Bill is now before Parliament, professedly for amending the laws relative to Patents. Our present limits will not allow us to enter into an analytical criticism of the several clauses; we can only now say in general terms, that alterations are suggested which do not appear to have any useful object—that financial sacrifices are proposed, which we know the Government are not disposed to concede—and that official forms of proceeding are contemplated, which are altogether impracticable. Upon the whole, it is evident that this Bill must have emanated from a source but little acquainted with the subject; and as no further notice is intended to be taken of it in Parliament until next session, it is probable that the whole will fall a dead letter. The following is the Bill, as printed:—

A BILL

To amend the Law relating to Letters Patent for Inventions, and for the better Encouragement of the Arts and Manufactures.

(Note.—The words printed in *Italics* are proposed to be inserted in the Committee.)

Preamble.—1. *Acts repealed:* 27 *Geo.* 3, *c.* 38; 29 *Geo.* 3, *c.* 19; 34 *Geo.* 3, *c.* 33; 5 *and* 6 *Will.* 4, *c.* 83, *partly repealed.*

"Whereas it is expedient to alter and amend the law relating to Letters Patent for Inventions, as well by rendering more easy and less expensive the manner of securing to individuals the benefit of their inventions, as by affording additional facilities to Patentees for the protection of their rights; and whereas an Act was passed in the twenty-seventh year of the reign of King George the Third, intituled, 'An Act for the Encouragement of the Arts of designing and printing Linens, Cottons, Calicoes, and Muslins, by vesting the Properties thereof in the Designers, Printers, and Proprietors for a limited time;' which said Act was, by another Act made in the twenty-ninth year of the reign of his said Majesty King George the Third, continued from the expiration thereof until the first day of July, one thousand eight hundred and thirty-four: and whereas an Act was passed in the thirty-fourth year of the reign of his said Majesty King George the Third, intituled, 'An Act for amending and making perpetual the said Act made in the twenty-seventh year of the reign of his said Majesty:' and whereas an Act was passed in the fifth and sixth years of the reign of his present Majesty, intituled, 'An Act to amend the Law touching Letters Patent for Inventions:' and whereas it is expedient that the provisions of the said three first recited Acts should be improved and enlarged; be it therefore enacted, by the King's most excellent Majesty, by and with the advice and consent of the Lords spiritual and temporal, and Commons, in this present Parliament assembled, and by the authority of the same, that the whole of the said recited Acts of the twenty-seventh, twenty-ninth, and thirty-fourth years of the

reign of King George the Third, and also the said recited Act of the fifth and sixth years of the reign of his present Majesty, so far as the said last-mentioned Act relates to the notice of objections to be given by the defendant to the plaintiff on pleading to any action brought by him for infringing any Letters Patent, shall be and the same are hereby repealed, but so as not to affect any thing done or executed in pursuance thereof respectively, or any such matter or thing now in progress under the authority of the said Acts respectively.

2. *That a person having obtained Letters Patent for England, Scotland, or Ireland, may, on payment of the usual fees, have them extended to the other two kingdoms, by inrolling a copy of the specification in the usual manner.*

"And be it further enacted, that all Letters Patent for Inventions to be hereafter obtained for England, Scotland, and Ireland, may be granted upon the condition to be expressed in such Letters Patent; that the person or persons so obtaining such Letters Patent, shall, within *six* calendar months next after the date thereof, inrol a specification in England in the usual manner now practised in England; and shall also within the same period inrol or deposit in Scotland and in Ireland, in the usual places of inrolment or deposit of specifications in Scotland and in Ireland respectively, a specification of the said invention: provided always, that all fees and emoluments whatsoever now due and of right payable on the obtaining of Letters Patent shall continue to be paid and payable to the several persons now or hereafter to become entitled thereto, or to any part thereof: provided always, that in every case wherein the conditions aforesaid shall be complied with, all Letters Patent which shall hereafter be granted containing the aforesaid conditions, shall be as valid and effectual in the law for protecting the several persons, grantees, assigns, or otherwise, who shall hereafter obtain such Letters Patent in England, Scotland, and Ireland, regarding the benefits to arise therefrom, as if separate Letters Patent had been obtained in the manner heretofore in use in England, Scotland, and Ireland respec-

tively: provided also, that all persons who shall be desirous of availing themselves of the provisions of this Act, shall be required to procure such Letters Patent in the same manner as heretofore in use in obtaining Letters Patent for England.

3. *All stamps on Letters Patent reduced to 2l.: 1l. on the petition, and 1l. on the specification.*

"And be it further enacted, that from and after the *passing of this Act*, there shall be raised, levied, and paid unto and for the use of his Majesty, his heirs and successors, in and throughout the whole of Great Britain and Ireland, for and in respect of all Letters Patent to be hereafter obtained for the protection of inventions, and in respect of the specifications of the same, the sum of *two* pounds sterling only; *one* pound thereof to be levied by a stamp of that amount, to be impressed on the first page of every petition to be hereafter presented by any person or persons who shall hereafter petition his Majesty for the grant of his said Letters Patent, and *one* pound sterling thereof to be in like manner impressed upon every specification to be inrolled under and by virtue of this Act, any usage, law, or custom now existing to the contrary notwithstanding.

4. *Warrant of a chief justice or chief baron substituted in lieu of the King's signature.*

"And be it further enacted, that in order to prevent the delay that hath heretofore arisen in obtaining Letters Patent for Inventions, it shall and may be lawful for any person who shall hereafter be desirous of obtaining Letters Patent for the sole making, exercising, vending, or using of any invention, when and as soon as he shall have obtained the report of his Majesty's attorney or solicitor-general upon the propriety of granting the same (provided always, that the said report of his Majesty's said attorney or solicitor-general shall be in favour of such grant), to make application to the lord chief justice of his Majesty's Court of King's Bench, the lord chief justice of the Court of Common

Pleas, or to the lord chief baron of the Court of Exchequer, or some or one of them, for a warrant to be signed by him, directed to his Majesty's said attorney or solicitor-general, directing and empowering him to prepare a bill in the manner heretofore in use in England; and that the warrant of such lord chief justices or lord chief baron respectively shall be as valid and effectual for empowering his Majesty's said attorney or solicitor-general to prepare such bill as aforesaid, as if the signature of his Majesty had been obtained thereto.

5. *Application to be made to chief justice of King's Bench and Common Pleas for their signatures to a Bill.*

"And be it further enacted, that for the purpose aforesaid it shall and may be lawful for any person so desirous of obtaining his Majesty's said Letters Patent for an invention, when and as soon as his Majesty's attorney or solicitor-general shall have affixed his signature to the bill prepared by him in the manner heretofore in use for his Majesty's royal signature, to cause a further application to be made to the said lord chief justice of the King's Bench, lord chief justice of the Court of Common Pleas, or lord chief baron of the Court of Exchequer, praying him or one of them to affix his signature to the said bill.

6. *Signature of lord chief justice to have the same validity as if the signature of his Majesty was affixed.*

"And be it enacted, that in every case when the said lord chief justices or lord chief baron respectively shall think fit to comply with the prayer of such application, the signature of such lord chief justices respectively or lord chief baron shall be as valid and effectual in the law for the purpose expressed in the said bill, as if his Majesty's signature had been affixed thereto: provided always, that nothing herein contained shall be taken or held to render it unnecessary to obtain his Majesty's royal signature to all Letters Patent for Inventions, when and as soon as the same can readily be obtained thereto.

7. Letters Patent to bear date from petition.

"And be it further enacted, that in all Letters Patent for any invention to be applied for after the passing of this Act, the day of presenting the petition to his Majesty for the grant of such Letters Patent shall be held and taken to be the date of such Letters Patent: provided always, that the specification of the invention for which the said Letters Patent shall be obtained, shall be inrolled in the manner heretofore in use in England within nine calendar months from the day of presenting the said petition: and provided also, that the term for which the sole making, exercising, vending or using of any invention to be hereafter secured by any Letters Patent, shall bear date from the day of sealing of the said Letters Patent.

8. Power of inspecting shops, &c., of parties suspected of infringement.

"And be it enacted, that if the grantee or assignee of any Letters Patent shall suspect any person or persons of infringing the same, it shall be lawful for such grantee or assignee, whether any action or suit at law or in equity shall or shall not have been previously brought, or shall or shall not be then pending, to apply exparte to any one of the judges of his Majesty's Court of King's Bench, Common Pleas, and Exchequer in chambers; and if such judge shall be satisfied, by the oath or solemn declaration of the applicant or other credible person or persons, that sufficient ground exists for such suspicion, and shall see sufficient reason for granting such application, it shall be lawful for such judge to make an order that the factory, shop, dwelling-house, or other place belonging to the party who shall be so suspected of infringing, or to any other person or persons where such infringement shall be suspected or believed to be carried on, shall be inspected by one or more engineer or engineers, or other fit and competent person or persons (to be approved of by such judge), for the purpose of ascertaining whether any such infringement is there carried on; and that such engineer or engineers, or other person or persons, shall be and is and are

hereby authorised to enter such factory, shop, dwelling-house, or other place, where such infringement is supposed to be carried on, and to give full effect to such order of inspection as fully and absolutely as if such inspection had been ordered or directed by one of his Majesty's courts of law or equity at Westminster, in an action or suit commenced and pending in such court of law or equity.

9. *Judge may direct that the engineer shall be accompanied by the under-sheriff of the county.*

" Provided always, and be it further enacted, that it shall be lawful for such judge, if he shall think fit, to order and direct that such engineer or engineers, or other person or persons so to be authorised by him, shall be accompanied on the occasion of such inspection by the under-sheriff of the county or city in which such inspection shall be ordered to be made, or by such other person or persons as such judge shall think proper; and any person or persons refusing to permit or obstructing the execution of such order, shall be dealt with in the same manner as for a contempt of an order of a court of law or equity at Westminster.

10. *For defraying expenses of inspection.*

" And be it further enacted, that the costs of the application for such order of inspection and of carrying the same into effect, shall be borne and paid by the party or parties applying for the same: provided always, that in case any action at law or suit in equity shall be then pending, or shall thereafter be brought, commenced, or prosecuted, and a verdict or decree shall be given or made against the party or parties so suspected of infringing such Letters Patent, it shall be lawful for the judge before whom such action or suit shall be tried or heard, to order and direct that such costs, or any part thereof, shall be paid by the party or parties against whom such verdict or decree shall be given or made, or to make such other order respecting such costs as he shall think fit.

11. *Power to extend term of Patent to fourteen years.*

"And be it enacted, that in case of an application to his Majesty's privy council for the prolongation of the term of any Letters Patent under and by virtue of the said recited act of the fifth and sixth years of his present Majesty, and upon the report to his Majesty of the judicial committee of the privy council in favour of such petition, his Majesty is hereby authorised and empowered, if he shall think fit, to grant new Letters Patent for a term not exceeding fourteen years after the expiration of the first term, any law, custom, or usage to the contrary notwithstanding: provided that no such extension shall be granted, if the application by petition shall not be made and prosecuted with effect before the expiration of the term originally granted in such Letters Patent.

12. *In case of action, &c., notice of objections to be given.*

"And be it enacted, that in any action brought against any person for infringing any Letters Patent, the defendant on pleading thereto, shall give to the plaintiff, and in every scire facias to repeal such Letters Patent, the plaintiff shall file with his declaration a notice of any objections on which he means to rely at the trial of such action, and no objection shall be allowed to be made on behalf of such defendant or plaintiff respectively at such trial, unless he shall prove the notice of such objection: provided always, that it shall and may be lawful for any judge at chambers, on summons served by such defendant or plaintiff on such plaintiff or defendant respectively, to show cause why he should not be allowed to offer other objections whereof notice shall not have been given as aforesaid, to give leave to offer such objections on such terms as to such judge shall seem meet.

13. *Property in new design secured to inventor or proprietor for twelve calendar months.*

"And whereas it is expedient for the greater encouragement of the useful arts and manufactures in these realms, to afford some

further protection and assistance to the inventors of new and useful improvements, by vesting the property therein in the inventors or proprietors thereof for a limited time; be it therefore enacted, that from and after the *one thousand eight hundred and thirty* , any person who shall invent, design, or contrive, or shall become the proprietor of any invention, design, or contrivance, whereby in the opinion of such inventor, designer, contriver, or proprietor, some new and beneficial operation or result shall be obtained in any art, science, manufacture, or calling whatsoever, shall, from and after the said have the sole right and property in every such new invention, design, or contrivance, for and during the term of *twelve* calendar months from the time of registering the same, as hereinafter mentioned: provided always, that every such inventor, designer, contriver, or proprietor, as shall be desirous of availing himself of the provisions of this Act, shall deposit, or cause to be deposited, in the manner and under the regulations hereinafter set forth, a full, true, correct, and perfect fac-simile, model, or specimen of his said invention, design, or contrivance, with the name and actual place of address of such inventor, designer, contriver, or proprietor attached thereto, in such manner as to the commissioners or registrars hereinafter named shall seem expedient; and shall also pay the sum of money in the manner, and at the time hereinafter in that behalf mentioned.

14. *Appointment of commissioners or registrars.*

"And be it further enacted, that it shall be lawful for his Majesty, his heirs and successors, under his or their royal sign manual, from time to time to appoint any number not exceeding *three* commissioners or registrars to carry into effect the provisions of this Act; which officers so from time to time appointed, shall hold their respective offices during good behaviour, notwithstanding the demise of his Majesty, or any of his heirs or successors: provided always, that it shall be lawful for his Majesty, his heirs and successors, to remove any of such officers upon some sufficient reason being found and assigned for such removal.

15. *Commissioners or registrars to receive deposits of models, &c. for exhibition, on payment of* 10*l.*, *and give certificate of license to depositor.*

"And be it enacted, that the said registrars shall as soon as conveniently may be after the said

approve of and provide some fit and proper place for the reception of all such fac-similes, models, or specimens, as shall thereafter be deposited in their custody under the provisions of this Act, and shall cause the same to be preserved and exposed to public inspection in as perfect and commodious a manner, and under such rules, regulations, charges, and expenses, as to the said registrars shall seem fitting and expedient, during the space of *twelve* calendar months from the time of the deposit thereof respectively; and shall also be entitled to demand from each person who shall be desirous of depositing such fac-simile, model, or specimen, under the provisions of this Act, at the time of such deposit, the sum of *ten* pounds sterling only; and shall also on receipt of such fac-simile, model, or specimen, and of the said sum of *ten* pounds, give to every such person who shall require or demand the same, a certificate of license, to be signed by one or more of the said registrars, certifying the date of such deposit, together with a general outline or description of such fac-simile, model, or specimen, to which the same shall relate: provided always, that the said registrars shall be entitled to demand for every such certificate the sum of *one* shilling only.

16. *Penalty for using unauthorised the subject matter of a license, or counterfeiting proprietor's mark, &c.—Holder of license not to be exempt in consequence of infringement of a Patent.—Subject matter of license not to be capable of being afterwards patented, or licensed a second time.*

"And be it enacted, that if any other person whatsoever after the said shall at any time during the continuance of the said term of *twelve* calendar months, bearing date from the day of the deposit of such

fac-simile, model, or specimen, either directly or indirectly, make use, vend, or put in practice, or in anywise imitate, counterfeit, or resemble the several inventions, designs, or contrivances to which the same shall respectively refer; or shall make, or cause to be made any addition thereto or subtraction from the same, whereby to pretend himself, or themselves the inventor or inventors, designer or designers, contriver or contrivers thereof, without the license, or consent in writing of the said person or persons whose name or names shall appear on the said fac-simile, model, or specimen relating thereto, and deposited as aforesaid; and also in the said certificate of license, or his or their assigns; or if any person shall, upon such thing not having been purchased from the person or persons named in such certificate, or his or their assigns; or not having the license or consent in writing of such person or persons, or his or their assigns, write, paint, print, mould, cast, carve, engrave, stamp, or otherwise mark the word 'Licensed,' or 'By the King's License,' or any words of the like kind, meaning, or import; or with a view of imitating or counterfeiting the stamp, mark, or other device of the person or persons so having obtained such certificate of license as aforesaid, or shall in any other manner imitate or counterfeit the stamp or mark, or other device of such person or persons, he shall for every such offence be liable to a penalty of *fifty* pounds, to be recovered by action of debt, bill, plaint, process, or information in any of his Majesty's Courts of Record at Westminster, or in Ireland, or in the Court of Session in Scotland, to any person who shall sue for the same: provided always, that nothing herein contained shall be construed to extend to subject any person to any penalty in respect of stamping, or in any way marking the words 'Licensed,' or 'By the King's License,' upon any thing made for the sole vending of which a certificate of license before obtained shall have expired: and provided always, that nothing herein contained shall be construed to exempt any person or persons who shall hereafter take advantage of the provisions of this Act from any liability to which he or they may subject

himself or themselves in any action, suit, or other proceeding to which they are now, or may hereafter become subject, by reason of any infringement or alleged infringement of any invention or contrivance for which his Majesty's Royal Letters Patent have been already, or may hereafter be obtained: and provided also, that no invention, model, or contrivance, for which a certificate of license shall have been granted under the provisions of this Act, shall be capable of being made the subject of Letters Patent thereof at any time after the date of such certificate, nor shall the same be capable of being made the subject of a second license thereof under the provisions of this Act.

17. *Application of monies to be received by registrars.*

"And be it enacted, that it shall be lawful for the said registrars for the time being to be appointed under the authority of this Act, to receive and take the said sums of *ten* pounds each on every such fac-simile, model, or specimen, as shall be deposited in their custody under the provisions of this Act; and also the said sum of *one* shilling on every such certificate of license as aforesaid; and also such sums of money as shall be received in respect of fees of admission to the public, for the inspection of the several fac-similes, models, and specimens, and to apply the amount to be so received by them in payment of such necessary expenses as shall be by them incurred in arranging, preserving, and exposing to public view the several fac-similes, models, and specimens, and account for and pay the surplus thereof at such times, and in such manner as to the Lords Commissioners of his Majesty's Treasury for the time being shall seem fit."

SCIENTIFIC NOTICES.

(Continued from p. 319.)

POLITICAL ECONOMY.—COMMISSION OF INQUIRY INSTITUTED BY ORDER OF THE FRENCH GOVERNMENT FOR THE REGULATION OF DUTIES UPON, AND PROHIBITIONS OF, FOREIGN MANUFACTURES, &c.

SEVENTH QUESTION. SILVER-PLATED GOODS.

The evidence given upon this portion of the examinations is of great importance to our Birmingham and Sheffield manufacturers, both on account of the rapid growth of this, but recent branch of French industry, and of the competition it anticipates the establishment of with our home manufactures in England itself, notwithstanding our protecting duty of 20 per cent. upon French plated ware. We proceed, as with the previous questions, to give only a condensed epitome of this interesting portion of the inquiry. The whole series of the examinations is well worth the attention of our statesmen and of the British public.

Five manufacturers, several of whom have visited our great works, have been examined by the Commission; viz. MM. Parquin, Gandais, Balaine, Bertholon, and Veyrat. These gentlemen differ considerably in their estimate of the amount of plated ware annually produced in Paris, which at present is the only part of France in which these works are established. The editors of the *Recueil Industriel* (Vol. VII., No. 19), take the estimate of M. Veyrat (six millions of francs, about 240,000*l.*) as being the nearest approximation to the truth. M. Parquin states, "The amount of silver-plated goods now made is much greater than formerly. When I first commenced, ten years ago, the trade employed four or five workshops; there are now twenty manufactories. I then manufactured annually to the amount of 40,000 francs; I now produce 700,000 francs worth of plated ware. The English have the advantage over us, because their rolled copper stands them in a lower price. Our rolled copper

costs us 44 sous * the pound, for the best quality, and 34 sous for the inferior; in England they plate upon copper that costs them only 26 sous, the quality of which answers to our copper at 34 sous: a superior quality is necessary for our purposes, because we employ the lathe for our works, which is better than the blocks and dies which the English use; their copper is not sufficiently malleable to be wrought by the wheel.

"The marc (8 ounces) of English plated ware costs on the average 25 sous, ours 40 sous. In England it costs only two sous the pound to flatten (roll) their copper; in France the cost is twelve sous. I export about 400,000 francs worth of the 700,000 francs I annually manufacture, principally to South America, some to the United States."

Q. "If the prohibition to France of the importation of English plated goods were replaced by a duty, would it injure the French works?" A. "It would be a great advantage to us, provided the English would receive our plated articles. France use annually to the amount of one million and a half; the English to the amount of thirty millions (1,200,000*l.* sterling). I have reason to think that I should sell much more in England than the English could in France. Their mode of manufacture is ancient and expensive; our plated goods would have the preference on account of their variety of patterns, and even on account of their cheapness. Notwithstanding their existing duty of 20 per cent. I would open a warehouse at London if I were less engaged.

"The English have not a hall-mark to verify the value of their plated articles as we have; a mode which is totally illusory, and which cannot indicate the proportionate quantity of silver upon the articles. The English manufacturer uses only his own mark or stamp, and establishes a sale proportioned to the confidence he inspires. *It is not the duty of 20 per cent. which hinders the sale of French plated ware in England;* if we wanted employment in the supply of our home demand, I would manufacture for the English market notwithstanding the difference in the price of rolled copper, which, although it affects low-priced

* The French sous is equal to our halfpenny; 20 sous make a franc.

articles, does not enter into the calculation in superior and large articles. For instance, I would send them candlesticks of beautiful patterns, which I could furnish at a lower price than theirs.

"It is to be observed that the English stamp all their pieces; the dies are very expensive. There are manufactories in Birmingham in which may be found three million dies. We work with lathes, and simple pieces of wood, and a half-day's work will turn out a pair of candlesticks. As the price of their dies is from 400 to 500 francs, it must necessarily form a principal feature of the prime cost of the article produced. Besides the dies or matrices for stamping, which the English use, accumulate in their workshops, and form a dead stock, which does not allow them to change to any great extent the patterns of their articles; you consequently see in England very old-fashioned patterns. We are continually changing our models or forms, which enables us to offer the most varied and elegant patterns in our articles.

"As to the admission of flatted (rolled) copper, if that were allowed at the present duty of unwrought copper, I am sure that above fifty thousand artisans more than are now employed would be set to work upon the manufacture of the copper, although the manufacture of the silver-plated ware can never reach to the extent it does in England.

Q. "To what cause do you attribute the difference?" A. "In England, silver-plate pays upon stamping a duty of thirty francs upon the marc; in France only two francs. There they cannot obtain a mark of worked silver-plate under 110 francs (about 10s. 8d. the ounce), and as the hall-stamp is indicative of its purity, unstamped silver-plate presents no security to the purchaser; plated ware is, for these reasons, generally preferred. As in France a marc of wrought silver-plate may be obtained for sixty francs, no one is inclined to pay thirty or forty francs for a marc of plated ware. The above are the causes of the comparative extended use of plated goods in England; the English make much, and they make it good; they make some sorts with one-

fifth of copper and four-fifths of silver. To sum up, I do not fear the introduction of English plated ware; it might injure us a little at first, but we should soon imitate their vases, and similar pieces, and produce them at a cheaper rate. I only fear their competition in articles of common manufacture for exportation, on account of the prime material in such (flatted copper), which they obtain lower than we do."

EXTRACT FROM THE EXAMINATION OF M. GANDAIS.

"I have been in the business (silver-plated ware) fifteen years; I commenced as a salesman of the articles from a certain manufactory, and did not deliver more than 25,000 francs per annum from my warehouse. At present I transact business to the amount of 450,000 francs (about 180,000*l.*)"

Q "Have you any information upon the relative state of the English and French silver-plated manufacture?" A. "It is difficult to establish the relative cost price of the French and English manufacture. *The English manufacture at considerable more expense than we do, and are less advanced than we are;* but they possess such extended means of vent for their productions, that they always sell them to advantage. They obtain, as we do, the copper of Sweden and Russia, which they smelt and amalgamate in like manner; but if our foundries could work at less expense and with better means, we could have our flattened copper as cheap as the English theirs. I manufacture principally for our interior consumption, I only export about one-third; the remainder is of superior quality, what the English call '*best plated*' with silver edges. If the prohibition were taken off to-day, I would have a warehouse in London to-morrow. I am of opinion that English plated goods might be safely admitted upon a protecting duty of 30 per cent. As to the cause of the immense amount of the English manufactory beyond ours, I would observe, that the fabrication of plated goods is of recent date in France, only about fifteen years; in England it has existed one hundred years. England extends its commerce throughout the globe, it sends its patterns every where, our manufacture

is merely progressing. We shall discover new processes, our workmen will become more expert, and the manufacture will be lowered in price. We now make candlesticks, one of the most numerous articles in this branch of trade, at 3 fr. the pair, which formerly cost 12 fr. to 15 fr.: it is true, that the present low price trenches somewhat on the quality; however, this manufacture is ameliorating, not only in respect of cheapness, but still more in quality. My best quality of plated ware has nothing to fear from English rivalry. I have made the beautiful specimens with silver edges which were in the national exhibition of this year, none such have been made before this. I could sell them in immense quantities in London. I export at this moment in competition with the English even common plated goods at a cheap rate."

EXTRACT FROM THE EXAMINATION OF M. BALAINE.

"I export to Holland, Belgium, and the colonies, about one-fourth of my produce. I manufacture principally beautiful and superior articles for our home consumption, consequently my productions enjoy a certain extent of reputation."

"Do you entertain fears as to the introduction of English plated goods under a duty?" A. "Great fears. I should regard this introduction as the ruin of the French manufacture, which is a new branch of industry in France, and requires protection. It is only by little and little that we can venture upon the great cost of dies, as in England. If the importation of English plated ware were allowed, our sales would, probably, entirely cease. The French purchaser has a kind of infatuation for English productions—they are in continual request. We can manufacture articles of plated ware perfectly similar to theirs, but not at so low a price, especially when we would imitate their Gothic patterns. My opinion is, that even with a very high import duty, we could not long compete with the English. It would be necessary to place a duty upon our goldsmiths' work equal to that which exists in England; the consumption of plated articles would then necessarily extend itself in France.

We export very little as compared to England; in low articles, which form what is called 'seaman's venture,' we may possibly be able to sustain a competition with England."

EXTRACT FROM THE EXAMINATION OF M. BERTHOLON.

"Q. What is your opinion as to the taking off of the prohibition of English plated ware?" A. "If the prohibition be taken off, this branch of industry will be lost to us. The English manufacturers obtain from their government a bounty of 30 per cent. upon the export of their plated goods; we have nothing of the sort."

Q. "This bounty of which you speak does not exist, your apprehensions should consequently diminish?" A. "There are other objections to be made. We cannot in France raise those vast establishments which exist in England. Rich persons and the English nobility place apitals in these establishments at 5 per cent. interest. The French manufacturers are obliged to work upon their individual resources, which are comparatively very limited; they find a difficulty in procuring money even at 8 per cent. Add to this, the French taste is continually changing, it is necessary to change our patterns at least once a-year. The English do not, like us, search for new patterns—with their dies, they possess more expeditious means than we have, they stamp."

Q. "Do you think that with a protecting duty you could sustain a competition with English plated goods?" A. "I believe that at first, particularly, we should be able to sustain it, because we have taken up in France the English taste; but it is a perverted taste which cannot subsist, we shall return to our French patterns. Then, upon the change of fashion, our manufacturers, who have been obliged to conform to the English taste, will experience a loss. I am afraid that the inclination to man ufac ture cheaply will injure the character of the French plated ware. People now sell counterfeit and fraudulent stamped plated ware: this fraud should be guarded against; the stamp should be suppressed, and every manufacturer should be compelled to verify

the quality of the article according to its title. In conclusion, this witness stated that the manufacture was confined to Paris, and extended from 100,000 to 120,000 francs the month." *

EXTRACT FROM THE EXAMINATION OF M. VEYRAT.

Q. "What is the actual state of the manufacture of plated ware in France?" A. "The total amount of the manufacture of plated ware may be estimated at about six millions of francs annually (about 240,000*l.* sterling). I have made this calculation equally on the authority of the custom-returns, and of the several manufacturers."

Q. "Do you think that the French manufacturer would be endangered by the taking off of the prohibition of English plated ware?" A. "For my own part I do not fear such a measure; if it were taken, I would immediately form an establishment in London; but I fear that three quarters of our manufacturers would suffer by taking off the prohibition. We export to the Spanish colonies, to Germany, to New York, to New Orleans, &c."

Q. "The manufacturers here complain of the pressure of the custom-house duty upon flattened (rolled) copper; do you participate in their opinion?" A. "It is certain that the English possess the prime material at a lower price than we obtain it at; but this difference is but a trifle in the English manufacture. They can form vast establishments; in these great works they can make sacrifices in order to obtain their prime materials; instead of raising the form, or pattern *(retaindre)*, as we do; they strike it from dies: besides, the English manufacturers are not exposed as we are to the piracy of their respective new patterns or models. The *brevets* that we take out for ours afford no security, they do not protect us against piracies."

* This estimate must be totally erroneous, for M. Parquin states that he makes annually to the amount of 70,000 fr.; and M. Gandais states his sales annually to be 450,000 fr.: these are two only of the twenty establishments in Paris.

Q. "Do you not experience difficulties in the process of flattening the copper?" A. "What I require is, not the admission of flattened copper, but that of the rollers of the flattening machines. We would willingly give 15 to 20 per cent. to obtain them. We obtain flattened copper from the works of Imphy and Romilly, but we further extend the sheets under our own flattening machines. Upon the subject of the probable extension of our plated works, I will observe that I am also a goldsmith; a piece of gold, or silversmith's work, requires four times the time for its manufacture that is required for a similar piece of plated ware. The mere workmanship of a piece of gold or silver plate costs as much as the entire piece of plated ware. A vase or vessel which would cost 50,000 to 60,000 francs, if silver, may be obtained in plated ware for 10,000 francs. A well plated vessel will last twenty years; in a few years the price of the vessel is saved upon the interest of the money which would have been expended for a silver vessel of the same description."

Q. "If the English suppressed their import duty of 20 per cent., do you think that French plated ware would find general sale in England?" A. "What we could sell in England would never counterbalance the injury which the English would effect in France by the introduction of their plated goods. There is in France at present a kind of '*Anglo-mania.*' Their models and patterns are far from beautiful, but we are obliged to copy them in order to satisfy the taste of the day. As to the law which obliges our plated ware to be marked, with a view to verify its quality, it is ineffective, it is a bad law."

Upon this highly important question the editors of the *Recueil Industriel* observe, "It is evident that the placing our plated ware under a public stamp, with a view to the verification of the quality of the article, is entirely fallacious, and only serves to encourage fraudulent manufacture. The law-stamping plated ware should be entirely abolished; it is sufficient that the manufacturer should be bound to put his own mark upon his goods, with an indication of the fineness of the silver employed. As

to the continuance of the prohibition of English plated ware, it may be deduced from the evidence of three of the five principal manufacturers examined by the Commission, that the importation may be allowed upon a duty of 30 per cent., without detriment to the French manufacturer."

We shall merely observe, in conclusion, that it is apparent that under a better system of official internal regulation, aided by the introduction of improved machinery for flattening the sheet copper, the French manufacture of plated goods would soon rival ours in cheapness of production, as it appears already to do in excellence of workmanship and beauty of pattern. The change which this rapidly improving branch of French industry may ultimately effect in the relative positions of the French manufacturer, and our Birmingham and Sheffield establishments, deserves the most serious consideration of this country.

July, 1836.

NOVEL INVENTIONS.

DR. CHURCH'S STEAM-COACH.

We have much pleasure in stating that Dr. Church has at length completely and satisfactorily accomplished the construction of a steam-carriage, in every way suited to run on ordinary roads.

The external appearance of the carriage is made exactly to resemble a stage-coach, and is about the same dimensions. It consists of a frame-work with a casing enclosing the boiler and engines; the furnace, fuel-box, water-chamber, and condenser, all of which hang upon springs, supported by the running wheels, require no auxiliary tender.

The casing is formed and painted like an ordinary stage-coach, the conductor sits for the purpose of steering in the

place of a coachman on the box in front; the engineer who attends the fire and the machinery, and has command of the steam, stands also in front, in an open compartment, below the conductor.

There are seats for persons on the roof before and behind, as in other stage-coaches; but as this carriage is intended merely to be the locomotive engine for impelling a train of carriages connected to it, the seats upon this are to be considered as of an inferior class.

Some of the most important features of the locomotive carriage as now completed, viz. the peculiar construction of the boiler and arrangement of the working parts of the machinery, form portions of the subject of a patent granted to Dr. Church, on the 16th March, 1835; the specification of which, embracing other matters, is too elaborate for insertion in our present number, but will most probably appear in our next.

As several partially successful, but, in our opinion, very unsatisfactory attempts have been made by other persons, to impel carriages on ordinary roads by steam-power, we consider it necessary to point out some of the peculiarities in Dr. Church's present carriage, which we consider to be its striking features of advantage.—Firstly, though the engines work at high-pressure, the eduction steam is so effectually condensed after passing from the working cylinder, that no visible portion of it escapes into the air, but the whole is converted into water, and re-conducted into the boiler in a heated state. Secondly, the flues are so constructed and arranged, that no smoke is allowed to escape from the chimney; and the consequences of these two novel features, as regards locomotive engines running on ordinary roads, are very important, viz. that neither is there any perceptible noise arising from the discharge of steam, or any offensive effluvia emitted from the combus-

tion, so that the carriage proceeds along the road without, in the slightest degree, attracting the attention of horses which may pass it.

We have only space to say further, that the Birmingham and London Steam-carriage Company, with whom the Doctor is connected in this invention, are perfectly satisfied with the carriage as now completed; and though alterations and slight improvements may and will necessarily be adopted in the future exercise of the plans, yet they deem the present carriage to be so fully effective and satisfactory, that they have advertised for a practical engineer to superintend the erection of a sufficient number of these carriages at their works, exactly according with the model produced.

We understand it to be the intention of the company to establish three stations between London and Birmingham for their trains of carriages to halt at, and to supply a fresh locomotive engine at each station, in order that the engines, after running about twenty-six miles, may be severally examined, and such little matters as cleaning, oiling, and adjusting parts attended to: which arrangement will avoid subjecting passengers to the inconvenience of delay, and tend greatly to prevent accidents.

We have only to add, that having witnessed the manner in which this carriage performs its duty on the public road, we have no hesitation in saying that we are now statisfied steam may be safely, and, we believe, economically employed, in connexion with Dr. Church's improved machinery, as an effective substitute for horses, in the ordinary transit of stage-coach passengers on all the turnpike roads in the kingdom.

New Patents
SEALED IN ENGLAND,
July, 1836.

To John Roberts, of Prestolle, in the parish of Prestwich, and county of Lancaster, calico printer, for his invention of certain improvements in the art of block printing.—Sealed 27th June—6 months for inrolment.

To Bennett Woodcroft, of Ardwick, in the parish of Manchester, in the county of Lancaster, gentleman, for his invention of an improved mode of printing certa colours on calico and other fabrics.—Sealed 2d July—6 months for inrolment.

To William Wainwright Potts, of Burslem, in the county of Stafford, china and earthenware manufacturer, William Maclune, of Burslem, aforesaid, china and earthenware manufacturer, and William Bourne, of Burslem, aforesaid, manager, for their invention of an improved method or process whereby impressions or patterns in one or more colours, or metallic preparations, are produced and transferred to surfaces of metal, wood, cloth, paper, papier machée, bone, slate, marble, and other suitable substances, prepared or otherwise, not being used or known as earthenware, porcelain, china, glass, or other similar substances.—Sealed 2d July—6 months for inrolment.

To Samuel Meggitt, of the town of Kingston-upon-Hull, master mariner, for his invention of certain improvements in anchors, and in apparatus for fishing such improved anchors, which improvements may respectively be adapted to anchors now in common use.—Sealed 2d July—6 months for inrolment.

To Robert Walter Swinbourne, late of South Shields, in the county of Durham, agent, for his invention of certain improvements in the manufacture of plate glass.—Sealed 4th July—6 months for inrolment.

To John Isaac Hawkins, of Chase Cottage, Pancras Vale, in the Hampstead-road, in the county of Middlesex, engineer, for an improvement in the art of manufacturing iron and steel, being a communication from a foreigner residing abroad.—Sealed 4th July—6 months for inrolment.

To William Southwood Stocker, of Birmingham, in the county of Warwick, mechanist, for his invention of improvements in machinery applicable to the making of nails, and other purposes.—Sealed 7th July—6 months for inrolment.

To Matthew Heath, of Furnival's-inn, in the city of London, Esquire, for new mechanical combinations for obtaining power and velocity applicable to the propelling of vessels, raising water, and to machinery of various descriptions, being a communication from a foreigner residing abroad.—Sealed 11th July—6 months for inrolment.

To Elisha Haydon Collier, of East India Cottage, City-road, in the county of Middlesex, formerly of Boston, in the state of Massachusetts, one of the United States of North America, civil engineer, for his invention of an improvement or improvements in steam boilers.—Sealed 13th July—6 months for inrolment.

To Miles Berry, of the Office for Patents, Chancery-lane, in the parish of Saint Andrew, Holborn, in the county of Middlesex, mechanical draftsman, for certain improvements in machinery or apparatus for forming staves for barrels, casks, and other purposes, being a communication from a foreigner residing abroad.—Sealed 13th July—6 months for inrolment.

To Lewis Matthias Horliac, late of Paris, but now residing in the Haymarket, in the county of Middlesex, gentleman, for certain improvements in carriages and harness, being a communication from a foreigner residing abroad.—Sealed 13th July—6 months for inrolment.

To Oliver Bird, of the parish of Woodchester, in the county of Gloucester, clothier, and William Lewis, of Brunscomb, in the parish of Stroud, in the said county, clothier, for their invention of certain improvements in machinery applicable to the dressing of woollen and other cloths requiring such process.—Sealed 13th July—2 months for inrolment.

To John Ericsson, of Brook-street, New-road, in the county of Middlesex, civil engineer, for his invention of an improved propeller applicable to steam navigation.—Sealed 13th July—6 months for inrolment.

To William Essex, of Cheetham, near Manchester, in the county of Lancaster, agent, for his invention of improvements in machinery for producing rotary motion.—Sealed 13th July—6 months for inrolment.

To Samuel Brown, of Boswell-court, Carey-street, in the county of Middlesex, engineer, for his invention of certain improvements for generating gas, which improvements are also applicable to other useful purposes.—Sealed 14th July—6 months for inrolment.

To Charles Phillips, of Chipping Norton, in the county of Oxon, surgeon, for his invention of improvements in drawing off beer and other liquors from casks or vessels.—Sealed 14th July—6 months for inrolment.

To John Ericsson, of Brook-street, New-road, in the county of Middlesex, civil engineer, for his invention of certain improved machinery to be used in the manufacturing of files.—Sealed 20th July—6 months for inrolment.

To Charles Wheatstone, of Conduit-street, in the county of Middlesex, musical instrument manufacturer, and John Green, of Soho-square, in the same county, musical instrument manufacturer, for their invention of a new method or methods of forming musical instruments, in which continuous sounds are produced from strings, wires, or springs.—Sealed 27th July—6 months for inrolment.

To John Hall, of New Radford, in the county of Nottingham, lace manufacturer, for his invention of certain improvements in certain machinery for the purpose by such improvements of facilitating the operation which is commonly called dressing or getting up, or finishing of large pieces of lace nets of various kinds, whereof some are called bobbin net or twist net, and other kinds are called warp net and tattings.—Sealed 27th July—6 months for inrolment.

To Peter Spence, of Henry-street, Commercial-road, in the county of Middlesex, chemist, for his invention of certain improvements in the manufacture of Prussian blue, prussiate of potash, and plaster of Paris.—Sealed 27th July—6 months for inrolment.

To Charles Brandt, of Belgrave-place, Pimlico, in the county of Middlesex, gentleman, for his invention of an improved method of evaporating and cooling fluids.—Sealed 27th July—6 months for inrolment.

METEOROLOGICAL JOURNAL,

FOR JUNE AND JULY, 1836.

1836.	Thermo.		Barometer.		Rain in inches.	1836.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low.	High.	Low.			Hig.	Low.	High.	Low.	
June						July					
26	69	48	30,19	30,13	,0125	11	79	60	30,04	29,80	
27	70	49	30,22	30,13		12	72	59	29,87	29,68	
28	82	47	30,08	30,03		13	73	45	29,94	29,91	,025
29	74	47	30,22	30,18		14	69	52	29,94	29,89	
30	73	41	30,22	30,12		15	63	48	29,84	29,61	
July						16	63	43	29,79	29,64	,5
1	84	63	30,07	30,05		17	70	53	29,98	29,79	
2	82	56	30,10	30,09		18	69	49	30,04	30,01	
3	81	46	30,14	30,13		19	65	44	29,84	29,73	
4	85	45	30,14	Staty.		20	54	49	29,58	29,43	,475
5	85	53	30,07	30,01		21	60	41	29,66	29,56	
6	75	54	30,06	29,96	,09	22	65	46	29,79	29,68	,25
7	73	43	30,13	30,12		23	63	49	29,98	29,94	
8	75	49	30,18	30,16		24	65	47	29,81	29,66	,025
9	78	48	30,15	30,13		25	65	50	29,86	29,68	,275
10	83	55	30,08	30,07							

Edmonton. CHARLES HENRY ADAMS.

Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

THE

London

JOURNAL AND REPERTORY

OF

Arts, Sciences, and Manufactures.

CONJOINED SERIES.

No. LIV.

Recent Patents.

To THOMAS SHARP, *of Manchester, in the county palatine of Lancaster, and* RICHARD ROBERTS, *of the same place, engineers, for certain improvements in machinery for spinning and doubling cotton, silk, flax, and other fibrous materials, being a communication from a foreigner residing abroad.*—[Sealed 8th October, 1834.]

THESE improvements in machinery for spinning and doubling cotton, silk, flax, and other fibrous materials, consist, firstly, in a peculiar construction or arrangement of the parts of a throstle frame for spinning and doubling; secondly, in the adaptation of upright drums for driving the warves or whirls in a throstle frame; thirdly, in a peculiar mode of mounting and driving the bobbins and the flyers in a throstle, for the purpose of causing them to revolve with distinct and dissimilar speeds; and, fourthly, in the adaptation of a peculiarly

formed spiral guide, sliding round a circular bead or rim, which guide is intended to act as a flyer in a throstle frame constructed to suit it.

For the purpose of more clearly illustrating these improvements, the Patentees have appended drawings, exhibiting the throstle frame in different positions, with the situations of the upright driving drums, and of the bobbins and flyers, and the manner in which they are actuated; also sectional figures of the bobbins and flyers detached from the machine; and likewise of a spindle with a pin-cop bobbin and the spiral guide in place of a flyer, with the manner of adapting this part of the invention to a throstle frame.

Plate XIV., fig. 1, represents a spindle *a*, *a*, upon which a disc *b*, is fixed, carrying the bobbin *c*. This spindle is made to revolve by a band from the driving drum passed round the warve or whirl *d*. A tube *e*, *e*, is affixed by its socket and screw nut to a stationary rail *f*, *f*; the upper part being bushed, to give steadiness, with little friction, to the spindle, which revolves within it, and is slidden up and down by the movement of the copping rail. On the outside of the tube *e*, another tube *g*, *g*, is fitted, carrying the flyer *h*, *h*, and warve or whirl *i*; and which last mentioned tube, with the flyer, is made to revolve by a band from the driving drum passed round the warve or whirl *i*. Hence it will be perceived that the bobbin and the flyer may be made to revolve by one driving drum at dissimilar speeds, according to the different diameters of the warves or whirls, and that, in this instance, the bobbin will run before the flyer; but, by driving the flyer with a speed nearly equal to that of the bobbin, the drag will be tempered, and a yarn of very high numbers may be readily spun and wound on the bobbin.

Fig. 2, is a variation of the same principle, in which the flyer *h*, is affixed to the top of the spindle *a*, in an inverted position, the tube *g*, carrying the bobbin *c*, being driven by the warve or whirl *i*, at a greater speed than the spindle and flyer is driven by the warve *d*, in order to effect the same object as described in reference to fig. 1.

Fig. 3, is a transverse section of a throstle frame constructed on the improved arrangement, in which the series of bobbins and flyers are driven by upright cylinders or drums, and showing the manner in which the driving bands pass from the upright drums to the warves or whirls of the spindles and of the flyers.

The end frames or standards of the throstle are shown at *a*, *a*, *a*, and *b*, *b*, on the longitudinal stationary rails, by which the ends are braced together, and the principal parts of the machinery supported: *c*, represents by dots the fast and loose pulleys, or rigger, over which a strap is passed from the first mover to drive the machinery; *d*, is the main shaft or axle, communicating motion to the working parts of the machine, and having a fly wheel and pulley affixed to its end, round which pulley an endless band passes over diagonal guide pulleys, and round the grooves at the upper parts of the upright drums *h*, *h*, *h*, for the purpose of giving rotary motion to the driving drums.

These drums *h*, turn upon vertical axles bearing in steps on a longitudinal rail at bottom, and are confined by a similar rail at top.

The spindles *i*, *i*, *i*, are ranged in series on each side of the frame, supported in steps at bottom by the copping rails *k*, *k*, and passed through tubes and sockets in the stationary longitudinal rails *b*, *b*. The construction of these spindles is the same as fig. 1, having a warve

or whirl affixed to each at the lower part, the bobbin bearing upon a disc mounted on the upper part of the spindle, and turning therewith; and the flyer is attached to a tube, as before described, and having a warve or whirl.

The copping rails *k, k,* supporting the spindles, are made to rise and fall, for the purpose of winding the yarns in uniform coils upon the bobbins by the ordinary contrivance, that is, by connecting those rails to pendant chains *l, l,* attached to rollers *m, m*; another chain *n,* attached to one of the rollers, and passed over the other, being made fast to one end of the lever *o, o*; which lever is mounted on a stud set in a transverse carrier rail *p,* and is made to vibrate by the rotation of the heart cam *q,* a cord and balance weight being attached to the reverse end of the lever.

In order to drive the spindles and flyers, bands or cords *r, r,* are passed round the respective warves or whirls of the spindles *i, i,* and round the upright drums *h*; and similar bands *s, s,* are passed round the respective warves of the flyers *j, j,* and also round the upright drums *h*; by which means, when the upright drums are made to revolve by the means before described, the spindles *i,* and flyers *j,* will be driven; and as the spindles ascend and descend, their driving bands or cords *r, r,* move up and down upon the periphery of the driving drums, always preserving the same altitude as the warves, and thereby keeping the bands or cords at all times at the same tension.

The cotton or other material in the state of rovings is placed in the machine upon large bobbins *u, u, u, u,* from whence it is conducted through the system of drawing rollers *v, v, v,* the upper or pressing rollers of the drawing system deriving their pressure from the transverse

bars *w*, bearing on their axles, which are drawn down by hooks *x*, with tension cords and weights *y*, *y*, *y*.

Having now fully exhibited and described the three first heads of our improvements, we proceed to explain the construction and adaptation of the spiral guide, to be used in place of a flyer, in the throstle frame.

Fig. 4, is a transverse section of a throstle, adapted to the employment of the spiral guide.

Fig. 5, represents one of the spindles *a*, *a*, on an enlarged scale detached, with its pin-cop bobbins *b*, *b*, shown in section; also the copping rail *c*, *c*, the step rail *d*, and the guide rail *e*, in section. A series of circular apertures are made in the copping rail, for the purpose of allowing spindles and bobbins to pass through. These apertures may be made to receive cylindrical sockets *f*, *f*, adjusted and held fast by a screw, as shown; or the apertures may be left open, without sockets. A ring *g*, *g*, (the upper side of which is represented at fig. 6, its under surface at fig. 7, and edgewise in section at fig. 8,) is to be affixed to the copping rail, either by fitting into the groove of the socket *f*, *f*, or by any other convenient mode of attachment, as by screwing down its rim *h*, *h*, to the copping rail. The form of the bead which constitutes the upper and inner edges of the ring *g*, is shown sectionally on a large scale at fig. 9, being of importance as to the correct working of the spiral guide represented at *i*, in the figs.

These spiral guides may be formed by binding a thin strip of steel, about the size of a watch spring, round a rod, as represented at fig. 10, so as to give it a screw or spiral figure; and when that figure is impressed upon the strip of steel, it is to be cut through longitudinally, that is, in the direction of the dotted line *a*, *b*, which will separate it into several distinct spiral pieces shown at

fig. 11; each of these pieces constituting one of the improved guides to be employed as a flyer. Or these spiral guides may be formed from steel wire coiled round a rod, at such an oblique angle as shall produce the required spiral figure.

A convenient mode of applying these spiral guide flyers in a throstle frame is shown in fig. *4*, where the yarn, as it comes down from the drawing rollers, is represented as passing under the spiral guides, sliding on the beads or inner edges of the ring *g*, and from the guides the yarns severally pass to the barrels of the pin-cop bobbins on the spindles within. The spindles being made to revolve by bands from the driving drum, passed round their warves as usual, the tension of the yarn extending from the bobbin will drag the spiral guide, and cause it to fly round upon the bead at the edge of the ring, and thereby twist the yarn. But the friction, produced by the spiral guide rubbing against the ring as it revolves, will partially retard its progress; and therefore, as the spindle and bobbin must revolve faster than the spiral guide flyer, the yarn will be taken up or wound upon the pin-cop bobbin as well as twisted: the form in which it is wound upon the bobbin, that is the shape of the cop, depending upon the ascending and descending movement of the copping rail, which raises and depresses the guide; but the manner of effecting the form of the cop is well known, and constitutes no part of this invention.

In adapting the improved spiral guide flyer to throstle frames of the construction just described and shown in fig. 3, we find it convenient to mount the guide ring, fig. 6, round the bead of which the spiral flyer slides upon the tops of arms rising perpendicularly from a disc, with a tube turning upon the spindle, as shown in fig. 12.

By this arrangement, the spindle and bobbin may be driven one speed, and the ring which carries the spiral flyer at a dissimilar speed; which will afford the means of relieving the friction of the spiral flyer, and thereby tempering the drag to suit yarns of higher numbers and more delicate textures than are usually spun by throstles.—[*Inrolled in the Rolls Chapel Office, April,* 1835.]

Specification drawn by Messrs. Newton and Berry.

To WILLIAM JOHNSON, *of the Horsley iron-works, in the parish of Tipton, and county of Stafford, gentleman, for his invention of a certain improvement or certain improvements in the construction of boots and shoes.*—[Sealed 22nd August, 1835.]

THESE improvements in the construction of boots and shoes are designed to afford simple, effective, and convenient means or modes of attaching and detaching the tension straps of trousers and gaiters in place of the ordinary straps employed for that purpose, which usually pass under the sole of the boot or shoe; and in that situation, are greatly exposed to wear, and collect dirt; are inconvenient in the manner of their attachment to the trousers and gaiters, and unpleasant to the wearer, by preventing the sole of the shoe or boot from being scraped clean, and the liability of the strap getting behind the heel.

The first mode which is proposed to be employed to correct these evils, is by forming a tube through the narrow part of the sole of the boot or shoe for the passage of a strap, cord, or chain, or for the reception of spring catches attached to the trousers or gaiters. The second mode is affixing metal studs or bars to the edges of the sole of

the boot or shoe, for the purpose of holding down the trousers or gaiters, by means of hooks, loops, or clasps attached thereto. The third mode is by affixing plates of metal to the sole of the boot or shoe, or by passing a plate of metal either under or through the sole, having projecting ends bent upwards, with slots, openings, or sockets, for the reception of spring catches, clasps, or studs, attached to the trousers or gaiters.

In the accompanying drawing, see Plate XV., fig. 1, represents a shoe constructed according to the first modification of the improvement, having a tube *a*, passed through the narrow part of the sole. This tube may be of thin metal quite through the sole, or it may merely have at the ends metal plates or sockets *b*. Through this tube a strap, cord, or chain, of elastic or non-elastic material, may be passed, the ends of which may be attached to the trousers or gaiters in any convenient way. Thus the trousers or gaiters may be held down, and some of the inconveniences above alluded to avoided; but I prefer to attach to the lower parts of the trousers or gaiters, spring catches with elastic straps; which catches I connect to the shoe or boot, by passing the catches into the tube *a*, and holding them fast by shoulders bearing behind the plate or in the sockets *b*. Fig. 2, represents one form of spring catch *c*, with the elastic strap *d*, supposed to be connected to the lower part of the trousers or gaiter by sewing, buttoning, or in any other convenient way; but I do not intend to confine myself to this particular form of spring catch. The catches *c*, being pressed into the sockets *b*, on each side of the sole, will, by means of their springs, hold the shoulder of the catch fast in the tube, and thereby afford the means of keeping down the trousers or gaiters with the desired tension.

The second modification of my invention is shown at

fig. 3, and consists in inserting into, or affixing to, the edges of the soles of boots or shoes on each side a metal stud *e*, which may be done by driving or screwing a pin with a knobbed or enlarged head firmly into the edge of the sole, or by rivetting a stud into a plate, and affixing these plates and studs firmly to the sole on each side. Small staples, loops, catches, or hooks, as *f*, fig. 4, or in any other convenient form, being attached to the lower parts of the trousers or gaiters by straps *d*, (which I should prefer to be of elastic material) these catches *f*, may be readily hooked on to the studs *e*, at each side of the sole, and will then keep down the trousers or gaiters with suitable tension.

The mode of attaching tension straps to a boot or shoe by means of a bar, is shown at fig. 5: *o*, being the bar, affixed to the side of the sole by any convenient means. Fig. 6, represents a catch or hook *h*, with a spring *i*. This must be connected to the trousers or gaiters by a strap *d*, as fig. 4, and being hooked on to the bar *g*, on each side of the boot or shoe, it will hold down the trousers or gaiters securely. This bar *o*, may be affixed to the sole of the boot or shoe, or it may be made moveable, and be attached to the strap of the trousers or gaiters, in order to be connected to the boot or shoe when occasion may require, for the purpose of attaching the tension straps. The connexion of the bar *g*, to the boot or shoe may be variously effected: one mode is shown at fig. 7, in which the end of the bar at *k*, is bent down and inserted into a socket in the heel, the reverse end having a spring catch, which will hold it fast when pressed into a cylindrical socket in the sole, as at *l*; or the bar may be made in the form of a staple, as fig. 8, which being attached to the strap of the trousers or gaiter, its ends may be inserted into sockets, or a socket in

the sole, as *b*, fig. 1, and by a spring and catches, be made to hold fast when so connected to the boot or shoe.

The plate of metal proposed to be passed through or under the sole of the boot or shoe is shown detached at fig. 9; it is to be made fast to the sole by pins or otherwise. The ends of the plate are turned up at *b, b*, and slots are cut in them for the introduction of the spring catches, and to form the bearings before described, against which they shoulder; portions of the sole leather being, of course, removed, or a recess formed through the sole for the reception of the spring catches. To these plates, at their turned-up ends, may be affixed the metal studs or bars described above, for the hooks, loops, or clasps, to be connected to.—[*Inrolled in the Rolls Chapel Office, February*, 1836.]

Specification drawn by Messrs. Newton and Berry.

To WILLIAM GODFREY KNELLER, *of Mitcham, in the county of Surrey, chemist, for his invention of improvements in evaporation.*—[Sealed 24th August, 1833.]

THIS invention applies principally to the evaporation of cane juice and saline liquors for the crystallisation of sugar and salt, and is described as consisting in the employment of certain apparatus or machinery capable of effecting the sudden compression of atmospheric air, which has been conveyed by means of inverted moveable chambers under the surface of the heated liquid about to be evaporated. The said volumes of air becoming expanded by the heat of the fluid, are made to pass beneath the lower edges of the chambers into adjoining chambers, and thence through holes in their tops through the superincumbered fluid.

This description does not appear to convey a very lucid illustration of the Patentee's intentions; but from an inspection of one of the figures of the apparatus, the scheme will be tolerably well understood. Plate XV., fig. 10, is a vertical section of a salt pan *a, a*, taken transversely, which may be supposed to be erected in brickwork, with a fire beneath it; or it may be heated in any other way, the brine occupying the pan up to the level shown by the broken lines. A vibrating apparatus *b, b*, called a ventilator, formed as a plate curved upwards, is mounted upon pivots, or an axle extending across the middle of the pan, and is by any convenient means made to vibrate, and so to dip into the liquid on both sides, as shown by dotted lines.

This ventilator is proposed to be constructed of iron, and is formed with sills in its under part, each of which sills will, of course, be occupied with atmospheric air. Now, on depressing the ventilator on one side, as shown by dots, the air contained in the sills of the depressed part will become heated, and, consequently, expanded, by immersion in the hot liquor, and will thereby be made to escape from the chambers, and pass upwards in bubbles through the liquor to the surface, carrying with it portions of the aqueous parts, and thus very greatly promoting the rapid evaporation and crystallisation of the saline matter. The returning vibratory movement of the ventilator will raise the immersed part, and depress the opposite, which will then cause the air contained in its sills to be discharged through the liquor in the same way.

Thus, by the reciprocating action of the ventilator, considerable quantities of hot air will be made to pass through the liquor, and promote evaporation of the aqueous parts of the saline or saccharine liquid.

The Patentee says, he does not intend to claim any particular forms or shapes in which this apparatus may be

made, but intends to avail himself of any fit and proper shapes, varying according to the kind of boiler or other apparatus to which it may be adapted ; and also constructs the ventilator of any suitable material, according to the liquid in which it is to be immersed, of which he takes a considerable range, as in the concentration of brines, medical extracts, alum, the manufacture of acids, the cooling of worts, glue and soap making, and in all cases where evaporation forms an essential part of the process.

It is also contemplated to use this apparatus in a close vessel, to assist in generating steam both of high and low pressure.—[*Inrolled in the Inrolment Office, February,* 1834.]

To SIR THOMAS COCHRANE, *Knt., commonly called Lord Cochrane, of Regent-street, in the county of Middlesex, for his having invented an improved rotary engine, to be impelled by steam, and which may be also rendered applicable to other purposes.*—[Sealed 11th November, 1830.]

THE construction of this rotary engine will be perceived by reference to Plate XV., fig. 11, which represents the engine in section taken transversely through the cylinder, the piston and its shaft.

The cylinder *a, a,* is fixed upon standards, having a shaft *b,* passed through it, which shaft carries a piston *c,* revolving within the cylinder. An internal cylinder *d, d,* made hollow and divided into two compartments, *e,* and *f,* is mounted in an eccentric position within the cylinder *a,* and there revolves, the peripheries of the two cylinders touching at bottom, where packing is placed to form a steam-tight joint. The ends of the cylinder *d, d,* also fit

accurately, and are packed against the interior of the cylinder *a*, so that no steam shall pass.

The steam from a boiler is intended to be introduced by a pipe into a recess in one end of the cylinder *a*, from whence it passes by an opening into the compartment *f*, of the inner cylinder, and thence through a passage in the piston to the part *g*, of the cylinder *a*, which becomes filled with steam; the other part *h*, of that cylinder, and the compartment *e*, of the inner one, with which it has an open communication, being kept in a state of vacuo.

It will now be perceived that the elastic force of the steam exerting itself in the space *g*, will force the piston round in the direction of the arrow, and hence give rotary motion to the shaft *b*, which may be communicated as a power for driving other machinery.

As the piston *c*, goes round with its shaft *b*, the inner cylinder *d, d*, is made to revolve also in the excentric position shown; and in so doing, as it approaches the lower part of the cylinder *a*, it will pass completely into the recess *f*, of the inner cylinder, at which time, by the position of the openings, the steam will be drawn off from the crescent-shaped chamber *g, h*, leaving that part of the engine in a state of vacuum; and as soon as the piston has passed the lowest point of its rotation, it will begin to protrude from the inner cylinder again, and the steam issuing from the passage in the piston will carry it round as before.

There are several modifications of this principle of operation proposed, very slightly varying in arrangement, but the Patentee says, that he does not consider his invention to consist in arrangement, but that he claims exclusively the employment of a lunate or crescent-shaped chamber, which is formed by two cylinders of unequal diameters placed excentrically, the periphery of one touching the other, and a piston sliding in and out the smaller cylinder.—[*Inrolled in the Inrolment Office, May*, 1831.]

To John Wallace, *of Leith, North Britain, brazier, for his invention of an improvement or improvements in the safety hearth for the use of vessels.*—[Sealed 31st March, 1831.]

These improvements are described as consisting, firstly, in a mode of "suspending" a ship's hearth, or cooking apparatus, in such a way, that it may be enabled to preserve its perpendicular position when the ship rolls in a heavy sea; secondly, in the adaptation of a damper, for the purpose of changing the direction of the heated air and flame; and thirdly, in the application of a smoke jack in the flue or chimney.

Judging from the multitude of figures in the drawings, and the long, but unmethodical description accompanying them, it would be supposed that this was a very complicated affair, but the particular points in which the improvements alone consist are very simple, and the remainder of the matter is a mere cooking apparatus, or ship's caboose, nearly of the ordinary construction.

Plate XV., fig. 12, represent the improved caboose in front elevation; fig. 13, the same, in sectional elevation, taken longitudinally. "The safety hearth is shown as placed on a curved stand or frame, which forms a railway upon which the hearth can move from side to side in case of the heeling of the ship, and whereby the hearth will be kept in its perpendicular position."

The base on which the cooking apparatus is mounted is fixed to the deck, and has curved ribs *a, a,* as railways, upon which rollers *b, b,* attached to the under part of the caboose, are intended to run. This is called "suspending" it; when, by the rolling of the ship, the caboose is thrown out of the perpendicular, its gravity causes it to roll to the lowest part of the railway, and hence to preserve its erect position.

In the section will be seen a flap or shutter *c*, which turns upon an axle *d*, having a handle on the outside. This flap is intended to close occasionally one of the two parallel flues *e*, *e*, for the purpose of damping or shutting off the heat of the fire *f*, either from the boiler *g*, or oven *h*; a current of air is admitted through an aperture in the side of the caboose into a channel *i*, between the fire *f*, and the oven *h*, which, becoming heated in its passage, descends to a bed of sand below the bottom of the oven, and thereby communicates heat upward to the oven in addition to that obtained from the flue above.

The smoke jack is introduced into the flue in an enlarged cylindrical pan *l*, the flyer *m*, being mounted on the top of a vertical shaft, which, as the flyer goes round by means of a worm or endless screw upon the shaft, drives the wheel and axle *n*, and hence by the pulley and chain *o*, turns the roasting spit in front of the fire at *p*.

The claim of invention is confined to the three features above, and not to the minor details of the apparatus.—[*Inrolled in the Inrolment Office, September*, 1831.]

To George Royl, *of Walsall, in the county of Stafford, whitesmith, for his invention of an improved method of making iron pipes, tubes, or cylinders.*—[Sealed 21st March, 1831.]

The Patentee states, that he first bends up the edges of the suitable strips of iron to form the skelp of a gun barrel, or other pipe or tube, by any of the ordinary known modes of bending skelps; he then heats one half of the skelp at a time in an air furnace, or other fire, and

having so heated it, he passes the skelp between a pair of grooved rollers placed at the mouth of the furnace, for the purpose of uniting (or marrying, as he terms it) the edges of the metal; that is, causing the edges of the open part of the skelp to be pressed together, and made to adhere and form a complete cylinder.

In order to enable the end of the skelp to be introduced between the rollers with facility, it is proposed to raise the upper roller by a lever connected to its carriage, and when lowered down again, and made to pinch the skelp, rotary motion is given to the rollers, and the skelp is by that means made to pass through, and the welding operation to be performed.

After the tube has been thus welded, it is to be passed between a pair of cylindrical dies, for the purpose of cleaning and scraping off the scales, and rendering the surface smooth. The upper of these dies is raised by a lever action, in order to introduce the end of the tube into the cylindrical hole; and when the end of the tube has been pinched between the dies, the tube is drawn through by tongs by any mechanical means actuated by a steam-engine, or other power.

The novel features of this operation are not pointed cut; and, as far as we can understand the Patentee's intention, he pursues exactly the same mode, and employs the same means, as are commonly resorted to for making ordinary gas tubing.—[*Inrolled in the Petty Bag Office, September*, 1831.]

To John Charles Schwieso, *of Regent-street, in the county of Middlesex, musical instrument maker, for his improvements in piano-fortes and other stringed instruments.*—[Sealed 2nd February, 1831.]

These improvements relate to the manner of fixing the tuning pins of piano-fortes and other stringed instruments, in order to give such stability to the pins as shall keep the strings in tune. Plate XV., fig. 14, is a plan or horizontal view of that part of the piano-forte called the rest plank, to which is to be affixed an iron or other metal plate *a*, called the rest plate, for the reception of the pins *b*, the strength of the metal plate affording the required resistance to the tension of the strings, which cannot be obtained when the pins are set in wood.

Fig. 15, is a section of the rest plank and rest plate, taken transversely in a vertical direction. The holes drilled through the plate are countersunk on each side, for the purpose of receiving binding or friction collars, which are affixed to the tuning pins. Fig. 16, represents one of the tuning pins detached, having one fixed collar; the other collar is to be attached to it by passing over the square head, and screwing on to the shaft of the pin.

Fig. 17, shows the manner of adapting the pin to a harp, the pin being passed through the wood-work, which is shown in section; the same will apply to a guitar, if made smaller: and fig. 18, represents a tuning pin applied to a violin, or other such kind of instrument.

In conclusion, the Patentee says, that he claims, first, forming the rest plate which holds the tuning pins of cast-iron, or other sufficiently strong metal; and, secondly, constructing the tuning pins with two binding or friction col-

lars, whereby the proper pitch of the note of such strings will be more easily obtained.—[*Inrolled in the Inrolment Office, August*, 1831.]

To MARCEL ROMAN, *of St. Michael's-alley, Cornhill, in the city of London, merchant, for certain improvements in, or additions to, apparatus or methods employed in throwing or winding silk, or other threads.*—[Sealed 19th November, 1833.]

THE subject of this patent is an appendage to, as well as an improvement upon, the ordinary reel employed for winding off silk from bobbins, and reeling it into skeins, and consists of a train of wheels which are intended to operate by means of clicks at certain periods of the winding process, for the purpose of giving a longitudinal movement to the guides that conduct the threads to the reel. By means of this apparatus, when a certain length of silk or thread has been wound upon the reel, the guides move sideways, and cause the next coils of thread to be wound upon other parts of the reel by the side of the preceding. The advantages of this apparatus are, that when a number of skeins of equal length shall have been wound upon the reel, the train of wheels produces the lateral movement of the guides, and causes another series of skeins of the same length to be wound by the side of the former; and hence, when the operation is suspended, the several skeins may be taken off the reel all of equal lengths ; and also that the train constituting a counting or measuring apparatus, will, at the end of certain lengths, throw itself out of gear, and cause the winding to cease.

This mechanism, consisting of many small wheels and pinions, with other minute parts, is necessarily complicated,

and requires many figures upon a large scale to render it evident: the description, too, is of considerable length; but as the subject is one of very limited application, we do not think it necessary to enter more fully into its details. —[*Inrolled in the Inrolment Office, March,* 1834.]

To BENJAMIN COOK, *of Birmingham, in the county of Warwick, brass founder, for his invention of an improved method of making a neb or nebs, slot or slots, in shells or hollow cylinders of copper, brass, or other metal, for printing calicoes, muslins, cloths, silks, and other articles.* —[Sealed 1st November, 1830.]

THE subject of this patent refers to a temporary mode of confining cylindrical shells of copper upon an iron or steel shaft or axle in calico printing machines.

Two patents have been taken by Mr. Attwood, of Birmingham (with whom the present Patentee was, we believe, connected), for modes of attaching these shells of copper to their axles; the one by soldering, the other by means of corresponding ribs and grooves called nebs or slots, formed or cut in the internal surface of the shell and upon the axle. (See vol. x. of our First Series, page 307.) The present invention appears to have the same object in view; but instead of forming the said nebs and slots, as formerly practised, it is now proposed to cut them longitudinally, by means of what is commonly called a planing machine. The interior of the shell may be either truly cylindrical or excentric, or elliptical, corresponding with a similarly formed shaft or axle.—[*Inrolled in the Petty Bag Office, May,* 1831.]

To Thomas Spinney, *of Cheltenham, in the county of Gloucester, gas engineer, for his invention of an improved earthen retort for generating gas for the purpose of illumination.*—[Sealed 17th November, 1832.]

This invention of an improved earthenware retort for generating gas for the purpose of illumination, consists of a combination of the following materials to form the earthenware of which the retort is composed; videlicet, Stourbridge fire-clay, burnt Stourbridge fire-clay, pipe or potter's clay, sand, sulphate of iron, commonly called green copperas, and potter's lead ore.

Very great nicety in the proportions in which the above materials are combined is not requisite, as the Patentee says he has found that the proportions may be varied, and yet a beneficial result obtained: his experience, however, induces him to prefer the following proportions.

Stourbridge fire-clay, one hundred pounds; burnt Stourbridge fire-clay, twenty pounds; pipe clay, twenty pounds; sand (which is recommended to be as free from lime as possible), twenty pounds.

The Stourbridge fire clay, the burnt Stourbridge fire clay, and the sand, are to be mixed together. The pipe or potter's clay must be well dried and broken into small pieces, and afterwards put into a copper or furnace, containing as much boiling water as may be requisite to dissolve or reduce it to the consistence of thick cream, which is to be added to the other materials previously mixed; and as much more water is to be added as will make the whole mass of such a consistence as will admit of its being tempered in the manner generally practised by potters.

The materials thus combined, may be moulded into retorts of any required form; but the Patentee says, I do

not mean hereby to confine myself to any particular form or size of retort; they may be made in one or more pieces, as may be found most convenient. If made in one piece, after being dried, it must be brushed over with a glaze or cement composed of the following materials in the following proportions: of potter's lead ore, three pounds; sand, four pounds; sulphate of iron, one pound; pipe or potter's clay, one pound. These are to be reduced to fine powder, and mixed with as much water as will bring them to the consistence of paint, and then applied with a brush in the same manner as paint is used by painters. The retort must then be removed to the kiln, and what is technically termed smoked from twenty-four to thirty hours, then gradually brought up to a white heat, and kept at that heat from twenty-four to thirty hours; and afterwards cooled or let down in the usual manner of cooling down earthenware. If the retort is made in more than one piece, the pieces should be formed to fit each other, and joined together with the above-mentioned cement or glaze. The retort so formed is also to be brushed over with the said glaze or cement in the manner explained when the retort is made in one piece.

In conclusion, the Patentee says, I do not mean or intend to limit myself to the use of Stourbridge fire clay, but to avail myself of any other clay which may be fit for the purpose; neither do I limit myself to the exact proportions of any of the materials above set forth, my invention being essentially the combination of the above materials to make an earthenware retort for generating gas for the purpose of illumination.—[*Inrolled in the Inrolment Office, May*, 1833.]

To JOHN HEATON, WILLIAM HEATON, GEORGE HEATON, *and* RUBEN HEATON, *of Birmingham, in the county of Warwick, manufacturers and co-partners, for their invention of certain machinery, and the application thereof to steam-engines, for the purpose of propelling and drawing carriages on turnpike roads, and other roads and railways.*—[Sealed 6th October, 1830.]

THE subject of this patent is a locomotive engine intended to run upon ordinary roads. It is represented in the drawings in three very indifferently executed perspective views, and appears to be extremely complicated in its construction. The description of this machine, containing two steam-engines mounted on a frame supported by springs, and running upon four wheels, is so exceedingly long (occupying eleven skins of parchment), that we feel unable to condense it into any thing like an intelligible form. We can, however, say, that it contains no new features, beyond the precise arrangement of its multitude of wheels, pinions, cranks, rods, and levers. The elementary parts of the machinery, taken separately, are considered as old, and are, therefore, disclaimed by the Patentees; but the arrangement of the whole mechanism, in the way it stands, is claimed as a novelty. The particular utility, however, of this arrangement, the Patentees have not pointed out, and from a careful perusal we have not been able to discover it.—[*Inrolled in the Petty Bag Office, February*, 1831.]

To Thomas Jevons, *of Liverpool, in the county of Lancaster, merchant, for an invention communicated to him by a foreigner residing abroad, of certain improved machinery to be used in manufacturing bar or wrought iron into shoes for horses, and also into shapes for other purposes.*—[Sealed 8th October, 1835.]

This invention consists in the construction and employment of three distinct machines for effecting, in consecutive succession, the several parts of the operations of cutting, stamping, and forming the shoe, from a bar of red hot iron.

The first machine receives the bar of heated iron, which has been previously rolled to the desired width and thickness, and after cutting off the proper length to constitute one shoe, spreads the middle of the piece between a pair of rolling segmental swages, and then lets it fall upon an inclined plane, which conducts it toward the second machine. The workman then takes up the prepared piece of iron, still red hot and of a straight form, and by a pair of tongs, introduces it into the second machine, where, by the action of a pair of rolling segment dies, the grooves, and also the recesses for the nail holes, are indented in the face of the straight piece. From this machine, the prepared and indented piece of iron, still in a straight form, is conducted in a similar manner to the third machine, and is then, by the workman attending, introduced between a pair of excentric cam rollers, which bends the piece (still in a red hot state) into the curved form of a horse-shoe, or other desired form.

In the accompanying drawing, see Plate XVI., fig. 1, represents a side elevation of the first mentioned machine; fig. 2, is a horizontal view of the same, some of the upper parts of the machine being removed to show the other ope-

rating parts more clearly; fig. 3, is a sectional elevation taken longitudinally through about the middle of the machine; and fig. 4, is a sectional elevation taken transversely at right angles to the former, through the machine in front of the swaging segments. The several letters of reference indicate the same parts of the machine in these four figures: *a, a, a, a*, is a rectangular frame, standing horizontally upon legs, and supporting the working parts of the machinery; *b, b*, are two side standards, fixed to the frame, in which two tumbler frames *c, c*, vibrate upon centres. These tumbler frames move simultaneously, carrying a pair of segment cams *d, d*, which I call the swaging rollers, as between the peripheries of these cams the heated iron is passed in order to be compressed. A sliding carriage *e, e, e*, is supported upon horizontal ledges *f, f*, fixed to the inner sides of the frame *a*; which carriage is moved to and fro by a crank rod *g*, connected to the main driving shaft *h*. Upon the horizontal sliding carriage *e*, a pair of cheeks *j, j*, are mounted in jaws *i*, and *k*; the one *i*, is firmly fixed to the carriage, the other *k*, is moveable, as a lever upon a pivot at *l*, set into the carriage. In the moving jaw *k*, one of the pair of cutters *m, m*, is fixed, the other corresponding cutter *m*, is mounted in a lever *n*, turning upon a fulcrum pin at *o*; and when the heated rod of iron has been introduced into the machine at A, A, the closing of these cutters *m, m*, sever that portion of the length of the bar of iron which will be required to form one horseshoe; at the same time the jaw *k*, closing, the piece of iron becomes confined laterally between the cheeks *j, j*, and the segment cams *d, d*, rolling, conduct the piece through, compressing and expanding its parts to the breadth and thickness of the required shoe, which constitutes the first part of the operation of making the shoe.

On the upper surface of the sliding carriage *e*, a hori-

zontal rack *p*, *p*, is formed, which takes into a toothed sector *q*, affixed to the upper tumbling frame *c*. This upper toothed sector *q*, is made sufficiently wide to take into, not only the rack *p*, but also into another toothed sector *r*, affixed to the lower tumbling shaft; hence it will be perceived, that by the reciprocating sliding movements of the carriage *e*, worked to and fro by the crank rod *g*, the rack *p*, will, through the agency of the toothed sectors *q*, and *r*, cause the tumbling frames, with the segment cams *d*, *d*, to perform oscillating movements.

The general construction of the machine being now understood, I proceed to explain its details, and the manner in which it effects the desired object of cutting off the portion of iron from the rod, and compressing and expanding it. The required driving power being applied to the crank shaft *h*, the carriage *e*, *e*, will be slidden to and fro upon its ledges by the crank rod *g*; and the segment cams *d*, *d*, will be made to reciprocate by the rack and toothed sectors.

The parts being situate as shown in fig. 3, the heated bar of iron is now to be introduced into the machine as represented at A, guided by a rest *s*, affixed to the front of the frame. The bar being pushed onward until its end comes against a stop piece *t*, the carriage *e*, *e*, in advancing, causes the back of the jaw *k*, (see fig. 2,) to be acted upon by the end of the wedge lever *v*; the reverse end of which lever is brought in contact with a stop *u*, as the carriage proceeds, and the lever being thereby moved into a position at right angles to the back of the jaw, is made to push it forward by its wedge-like action, and the cheeks *j*, *j*, are thereby closed, and made to confine the bar of iron between them. By the same forward movement of the carriage, an inclined plane at the back of the lever *n*, is brought against an inclined stud *w*, which forces the lever *n*,

forward, and with it the cutter *m*. By these means, the two cutters *m*, *m*, are brought together, as shown by dots in fig. 2; and the bar of iron A, being between them, is severed, leaving the piece of iron which is to form one horse-shoe between the cheeks *j*, *j*.

The further rotary movement of the crank shaft now slides the carriage *e*, backward, and in so doing, causes the rack *p*, to give the rolling action of the tumbling frames *c*, *c*, and to the segment cams *d*, *d*, which, in rolling, compress and expand the parts of the piece of iron to the required shape, as shown in different views at fig. 5.

It must be here observed, that in order to give the proper figure to the piece of iron, one of the cheeks *j*, must be slightly curved; and also, that the swaging cams *d*, *d*, must be made in a slight degree excentric and bevelled, so as to render the piece thinner in the middle, and on the edge intended to form the inner part of the shoe, and leaving the heel parts thick: of course, these may be varied to suit taste and circumstances, and for the purpose of producing other forms. At the commencement of the retrograde movement of the carriage *e*, a pin *y*, set in the upper surface of the lever *n*, works against the side of a bar *z*, *z*; and when this pin *y*, comes against the inclined plane *l*, on the side of the bar, the lever *n*, with the cutter *m*, is forced back, and brought into the situation shown in fig. 2, which opening of the cutters makes way for the rolling swages. The further retrograde movement of the carriage *e*, causes the tail of the wedge lever *v*, to come in contact with the stop 2, fixed on the side frame, which throws the lever into the oblique position, and allows the jaw *k*, to open. On the carriage *e*, proceeding a little further in its retrograde movement, the tail of the lever *x*, comes in contact with another stop 3, fixed on the opposite side of the frame; which stop brings the lever into a position at right

angles to the carriage, and causes it to force back the moving jaw *k*, which releases the piece of iron from beneath the cheeks *j*, *j*, and allows it to fall through into an inclined plane placed beneath the machine, by means of which the piece is conveniently conducted towards the workman, who instantly places it in the second machine, where it is to be stamped, that is, the grooves and nail holes formed.

The construction of the second machine is the same in most of its operating parts as that already described. The piece of iron is put into the machine in the same situation as the red-hot bar was first introduced, and the piece is passed between segment rollers in the same manner; but in this machine the segment rollers are dies, by means of which the grooves and recesses for the nail holes are formed.

Fig. 6, is a horizontal view of the second machine, partly in section as fig. 2, the upper tumbling frame *c*, the tooth sector *q*, and upper segment die, being removed, to show the other working parts more clearly. A narrow bar 4, extends horizontally about half-way between the cheeks *j*, *j*, in the jaws *i*, *k*. This bar is fixed to the front of the frame *a*, and upon it, between the cheeks, the piece of hot iron prepared in the former machine is to be placed.

In order to bring this piece of iron into a situation for the rolling dies to act properly upon it, a projector 5, is made to slide horizontally on the upper surface of the bar 4. This projector is attached to one end of a double-armed lever 6, 6, turning horizontally upon a fulcrum pin, fixed in the front part of the frame *a*. Now, as the carriage *e*, *e*, advances, one end of a right-angled lever 7, 7, mounted in a bracket arm 8, extending from the carriage, comes in contact with the outer end of the double-armed lever, 6, which causes the projector 5, to push the piece of iron into the proper situation between the cheeks; and

when the projector has moved sufficiently far, it is withdrawn by the force of a spring 9, acting upon the double-armed lever 6, the right-angled lever 7, having been withdrawn from the end of the lever 6, by an adjustable stop 10, fixed at the side of the frame. The receding of the carriages *e*, *e*, now causes the rolling dies to act upon the piece of heated iron as it passes between them; but in this instance its figure is not altered, the upper rolling die simply impressing the surface of the piece of iron, and forming the grooves and recesses for the nail holes, as shown in fig. 7, which represents the piece in the second stage of the operation of making a horse-shoe. The further receding of the carriage *e*, *e*, brings the levers against the stops, as described in reference to fig. 2, by which the jaw *k*, is opened, and the piece of iron let fall on to an inclined plane, ready to be taken and introduced into the third machine.

Fig. 8, shows the pair of rolling dies mounted in the tumbling frames, as they would appear on the reverse side to fig. 8. The edges of the dies are bevelled, to form the grooves in the horse-shoe; and these are made with projecting studs or points, which produce the impressions for the nail holes. It is scarcely necessary to say, that these dies are adjustable by screws shown in the last described figure.

The machine for effecting the third part of the operation, that is, bending the piece of iron into the form of a horse-shoe, is shown in side elevation at fig. 9, in horizontal view at fig. 10, and in front elevation at fig. 11: *a*, *a*, *a*, is the framework, in which are mounted two spindles or vertical shafts *b*, and *c*. Upon the end of a horizontal shaft *d*, a pulley *e*, is fixed, round which a driving strap is to be passed, communicating with the steam-engine, or other first mover. A horizontal sliding bar *f*, is mounted in

grooved brackets at the back of the frame, on the face of which bar a rack or row of teeth *g, g,* is formed. Upon the vertical shaft *b,* a toothed wheel *h,* is mounted, which takes into the rack *g,* of the sliding bar. At the back of the framework a crank rod *i, i,* is connected at one end to the sliding rack bar by a joint *k,* and at the other end to a crank *l,* on the back end of the driving shaft.

Fig. 12, is a horizontal section of the vertical shafts *b,* and *c,* with the excentric gear *m,* and *n,* affixed to the lower parts of those shafts. At the bottom of the shaft *b,* the block *o,* for forming the shoe, is affixed; and at the bottom of the other shaft *c,* the cam or follower *p,* is attached, and also the plate *q,* intended to operate as a guider in the act of bending the piece of iron round the block.

Fig. 13, is a horizontal view of the lower ends of the spindles *b,* and *c,* with the block *o,* and following cam *p,* their reverse or under sides being represented upwards. The piece of iron prepared as above described, is to be introduced into this machine in front, as shown at A*, in figs. 12, and 13. A small nipper lever *r,* turns upon a pin set in the bent arm *s,* extending from the back of the block; which nipper lever, on the opening of the cams (that is, the block and follower) to receive the piece of iron to be bent, is brought into the position shown in figs. 12, and 13, taking hold of the end of the piece of iron, and keeping it firmly against the block. Rotary motion being now given to the spindle *b,* by the sliding rack bar *f,* actuated by the crank *l,* as described above, the excentric gear *m,* and *n,* of the two spindles *b,* and *c,* with the block *o,* and follower *p,* will revolve together, and cause the piece of iron A*, to be bent round to the shape of the block *o,* which finishes the operation of forming the horse-shoe, fig. 14. On the nipper lever *r,* coming round, it will strike against the end of a

curved horn *t*, attached to the block of the follower, which will throw open the nipper lever, and allow the shoe to fall down from the machine.—[*Inrolled in the Rolls Chapel Office, April,* 1836.]

Specification drawn by Messrs. Newton and Berry.

To JOHN COLLINGE, *of Lambeth, in the county of Surrey, engineer, for his having invented an improvement or improvements on the apparatus for hanging or suspending the rudders of ships or vessels of different descriptions.*—[Sealed 1st November, 1830.]

THE subject of this patent is merely the adaptation to a ship's rudder (in place of the pintle) of the ball and socket hinge, which the Patentee invented and obtained a patent for in November, 1821. (See vol. vi. of our First Series, p. 249.)

The upper bearing joint or pintle of the rudder is formed with a spherical end bearing in a cup or concave hemispherical socket fixed to the stern post. The ball has a groove formed round it in a vertical direction, for the purpose of allowing oil to flow freely to lubricate the joint, and a leather cap is placed over the ball and socket for the purpose of excluding the sea water.

By this contrivance it is considered that the rudder of a ship may be more readily shipped and unshipped when required, and that the wear will be more uniform, the rudder more steady in its action, and the joint or pintle less likely to be broken off.—[*Inrolled in the Petty Bag Office, May,* 1831.]

To Charles Stuart Cochrane, *of Great George-street, in the city of Westminster, Esq., in consequence of a communication made to him by a certain foreigner residing abroad, for certain improvements in the preparing and spinning of Cashmere wool.*—[Sealed 13th November, 1830.]

It is stated by the Patentee, that the wool of the Asiatic or Thibet shawl goat, called Cashmere or Indian wool, has not hitherto been prepared in Great Britain; but that all the imitations of Cashmere shawls, and other goods of that description, which have been manufactured in this country, have been woven here from yarns prepared and spun in France, and imported into this country, and that it has been much desired that the French process of preparing and spinning this material should be made known to British manufacturers. In consequence of this information being required, the Patentee has procured from M. Hinderlang, of Paris, the particulars of the manner in which he prepares the Cashmere wool in his factory; which process forms the subject of the present patent.

The wool, after being unpacked from the bag in which it is imported from India, is spread out upon a sort of large sieve, and beaten with sticks by women, for the purpose of opening its fibres and clearing away the dirt: when that has been done, the wool is to be washed in water with soft soap and sorted, the coarse hairs being picked out by children; and after such sorting and picking, the finest portions of the wool are to be combed, as is usually done in preparing wool for spinning worsted, and bleached by the process of sulphur. The short and inferior part of the wool left in

the teeth of the combs is to be sold with the coarse hair to hatters; and the long wool thus prepared by combing, &c. is then operated upon in the way usually practised in making worsted goods.

The second or inferior quality of Cashmere wool, suited for spinning up to No. 45, after having been opened, picked, and washed as above, is introduced into a preparing machine, constructed with a series of revolving cylinders placed in a consecutive horizontal range, the several cylinders being covered, every other one with bristles, and the intervening ones with needle points. Into this machine the wool is fed between rollers; and as it is drawn along, its fibres become straightened by the rotary action of the bristles and needles, and at the end of the range is wound upon a drum in the ordinary way of capping. The lapped roll of wool is then taken to a carding engine, and carded as usual; from whence it is conducted between drawing rollers, and is then roved, slubbed, and spun in the ordinary way.

The Patentee says, that he does not claim any of the machinery employed as new, excepting that first described for operating upon the inferior quality, consisting of cylinders of brushes and points; and that his claim consists in preparing Cashmere wool for the manufacture of imitation Indian shawls, and such kind of goods which has never before been done in these kingdoms.—[*Inrolled in the Petty Bag Office, May, 1831.*]

To Humphreys Jeffery, *of Birmingham, in the county of Warwick, goldsmith and jeweller, for his invention of certain improvements in buttons.*—[Sealed 28th November, 1835.]

This invention is described as an improvement in those kinds of metallic shanks which are raised or formed out of the piece of metal intended for the button or button back, and also in an improved shank made of wire, and fastened to the button blank by means of a stamp or press, without the use of solder or any other extraneous matter. To make a button, commonly called a brace button, also the back or underside for a metallic shell button, or for a Florentine silk cloth or other covered button, I take a circular piece of sheet iron, or other metal suitable for the purpose, and of the requisite size and substance, and by stamping or pressing the back or underside of the button with a rim at the edge, and a swell in the centre, as shown in the drawing, see Plate XV., fig. 19 : I then, by means of a pair of piercing tools, figs. 20, and 21, holding the button bottom in the form or position shown in figs. 22, and 23, cut or pierce two sides of the central swell (which swell may be either circular or oblong), and at the same time turn the edges of the metal where so cut or pierced, and intended to form the shank under and not over the shank, in such manner as to round the edges in all parts, to avoid cutting the thread or cloth.

The edges so turned should not be made merely to approach or go near to each other, but they should be actually doubled under until they touch the underside of the shank, and be pressed against it; and it is a feature of this mode of forming the shank by doubling under the edges of the elevated and pierced centre, that it may be done in iron as well as in copper or brass; the operation and the tools used in effecting it are of the most simple description.

The iron for the button back must be the best charcoal iron, and it should be annealed during the process. Fig. 25, shows the concave side of the button back, and 26, the convex side, with the shank complete.

The tools used for cutting or piercing the shank, and at the same time turning or rounding the edges thereof, must be formed with great accuracy in order that they may take off the rough edges of the metal forming the shank, otherwise if any rough or sharp edge be left, it will cut the button-hole, and also the thread or other material, in sewing the button on the garment. Fig. 20, shows the punch *a*, and the bed *b*, in the position for piercing and bevelling and throwing back the edges; and fig. 21, the same tools when the shank is pierced. Fig. 24, shows a section of the piercing and bevelling punch, one side being flat and the other round; and fig. 23, F, shows a perspective view of the piercing tools with the button in them; figs. 22, and 23, show respectively the outside and inside of the button back in the act of piercing.

To make solid metal buttons, take a common metal button shank of the size required, and by means of a stamp or press from two small square concavities, (see fig. 28) near the centre, at proper distances, to receive both ends of the shank; I then take a common button shank of the form shown by fig. 29, the ends of the shank being made to fit into the concavities of the button blank; I then put the shank into a shank die with the ends inserted into the concavities of the blank, and then with a top die to be forced or struck down upon it by means of the press or stamp, unite or fasten the shank and blank together, and at the same time by the use of the press or stamp impress upon the button any fancy pattern if required. Fig. 30, shows this shank complete.

Now, whereas I claim as my invention the following improvements, (that is to say) the improved shank to the brace

button or bottom for a metallic shell, Florentine or other covered button, which shank being raised as aforesaid out of the metal, is so cut or pierced that the edges of the shank are turned under as aforesaid, which turning under prevents the cutting the thread of the button-holes complained of in the raised and cut or pierced shank, the edges of which are not turned under as aforesaid. Secondly, the wire shank fixed or rivetted to the button without the use of solder.—[*Inrolled in the Inrolment Office, May*, 1836.]

[The same object, viz. making apertures in a button shank pressed out of a metallic disc, formed the subject of a patent granted to Dr. Church, 26th March, 1829.—[See our Second Series, vol. v. p. 249; and also another patent to John Holmes, 4th May, 1833. See the present conjoined series, vol. iii. p. 69.—Editor.]

To David Napier, *of Warren-street, Fitzroy square, in the county of Middlesex, engineer, for his having invented certain improvements in printing and in pressing machinery, with a method of economising power applicable to the same; which method of economising power is also applicable to other purposes.*—[Sealed 13th October, 1830.]

These improvements are divided into four distinct heads; the first of which apply to a rotary printing machine, the second to an inking apparatus, the third to pressing paper after it has been printed and dried, and the fourth to a means of overcoming the dead point of a crank or winch.

The general features of the machine are the same as those usually employed for printing, called Napier's, having two printing cylinders, two tables and forms of type, and in

for the purpose of bringing it into tension; which lever may be raised by hand, or by any connexion with the stroke of the steam piston; and it is suggested that this contrivance may be adapted to other machinery where the crank or winch is employed.—[*Inrolled in the Inrolment Office, April,* 1831.]

To John Tyrrell, *of St. Leonard's, in the county of Devon, Esq., barrister-at-law, for his invention of a method and apparatus for setting sums for the purpose of teaching some of the rules of arithmetic.*—[Sealed 13th November, 1830.]

This is one of the most extraordinary schemes that we ever remember to have seen dignified with the title of patent. This "apperatus, for setting sums for the purpose of teaching some of the rules of arithmetic," is described as consisting simply of several strips of parchment or stiff paper, on which numerical figures are to be written. These strips are to be placed one above the other, and wound upon small rollers enclosed within a box, in which a small aperture is cut for the purpose of exposing to view so many of the figures only as are required, when arranged, to constitute the sum intended to be worked, which is done by drawing along or winding up the strips until such figure are seen through the aperture.

No directions are given as to any mode of applying these figures, or of working the sums, nor is any novelty in the process of making the caculation proposed; it seems that the apparatus above described is merely designed to show the figures of a sum in black and

white, in order to save the trouble of writing them upon paper or upon a slate.

Apertures of different shapes are proposed to be cut in different boxes, and strips figured in different ways, to suit the kind of sum to be stated in either of the four first rules of arithmetic, whether in simple numbers, or of pounds, shillings, and pence, or of weights or measures.

It is proposed that a teacher, after having set any sums by arranging the figures in certain ways, shall cast them up and write the result in a pocket book, in order that, at a future time, when looking over a pupil with the same sum, he may refer to his book, and save the trouble of casting it up. This appears to be the whole matter of the invention.—[*Inrolled in the Inrolment Office, May,* 1831.]

To Samuel Brown, *of Billiter-square, in the city of London, commander in the royal navy, for his invention of certain improvements in the means of drawing up ships and other vessels from the water on land, and for transporting or moving ships, vessels, and other bodies on land from one place to another.*—[Sealed 6th December, 1830.]

In order to effect the drawing of ships from the water on to land, a strong tramway of three parallel lines of large stones is to be laid as an inclined plane, extending from the land down into the water to the low water mark. Upon this tramway the ship is to be drawn up out of the water, by first floating a cradle under her hull when she rides high enough in the water, as at high tide; and then having brought the cradle, with the vessel in it, exactly over the

tramway, and placed rollers under it, she is allowed to come to rest in that situation when the tide has subsided. A drag chain is then attached to the hull of the vessel, and by means of a windlass or capstan, worked by manual, or by steam, or any other power, the cradle with the vessel is drawn forward upon the rollers until she is completely upon the dry land.

Plate XVI., fig. 15, shows the manner in which a vessel would be conducted upon an inclined plane from the water. This mode of drawing a ship from the water on to dry land, appears to us to be precisely the same as the mode proposed by Mr. Thomas Morton, of Leith, and for which he obtained a patent in March 1819. (See the First Series of the London Journal of Arts, vol. i. p. 17.)

The present Patentee, however, states, that one of his principal novel features is the adaptation of a chain of rollers to be placed under the cradle, to assist in drawing the vessel forward, instead of pulleys or wheels turning upon axles attached to the frame or cradle, and running upon the edges of iron rails.

The construction of these chains of rollers are not very well explained, but as far as we understand the Patentee, there are to be series of long rollers connected by chains attached to their axles; and that three series of these chains of rollers are to be employed, one rolling upon each of the lines of stone railway, and supporting the cradle with the vessel; and that edge rails of iron are to be placed to the rollers to prevent them from deviating out of their direct course.

Having brought the vessel to land in the cradle upon rollers, the Patentee proposes that it may be, in like manner, conducted to any desired distance over land by means of truck chains or ropes drawn by locomotive engines. In order to withdraw the vessel from the direct line of tram-

way and place it on one side of the line, certain parts of the line have transverse framings, by which the cradle, with the vessel, may be moved in a lateral direction; and in order to raise the vessel from one level to another, temporary inclined planes are proposed to be constructed of iron, much in the same way as iron bridges.

These are all the features which appear to be considered by the Patentee as new, though he has, in his specification, given a very elaborate description of the invention, and exhibited it in various positions in several rudely executed landscapes. Enough, however, has been said to render the intention evident.—[*Inrolled in the Inrolment Office, June,* 1831.]

The specifications of some few of the inventions for which patents were granted in 1830, having, by accident, been omitted in their proper order of time, we have inserted them in this present volume, in fulfilment of our pledge to report every new invention for which a patent should be obtained.

Of the one hundred and eighty patents granted in England in that year, one hundred and seventy-five have been described in the pages of our journal; of the remaining five, no specifications have been inrolled in Chancery, therefore, these patents have become *null and void.*—ED.

BILL FOR REGULATING TOLLS PAYABLE BY STEAM-CARRIAGES.

We are happy to inform our readers that the above Bill, referred to in our last number, has been rejected by the House of Lords, and we now give the Report of the Select Committee appointed by the Lords to investigate the matter and hear evidence thereon; and although we do not agree with the opinion expressed in their report, yet we congratulate our friends who are interested in steam locomotion, that the intended Bill has met with that fate anticipated in our last.

Report of the Select Committee of the House of Lords (presented by the Duke of Richmond) on tolls for steam-carriages.

That the Committee have proceeded to the examination of witnesses, and have to report that the evidence of the principal engineers who have turned their attention to the construction of carriages impelled by steam upon the highways, proves that very considerable progress has been made towards their perfection, and that they can travel with great rapidity.

The noise and smoke attendant upon their use have been very materially diminished, but it has been shown in evidence that they still have the effect of terrifying horses, and that accidents have occurred in consequence. Much conflicting evidence has been tendered to the Committee as to the safest shape and proper limitation of the vessels for the generation of steam to be used in these carriages. All the witnesses, however, agree, that in whatever shape the boilers may be made, their size should be such that, in case of explosion, they would not endanger the safety of the public. And the Committee do not feel themselves at present competent to come to such a conclusion on these two important points as would enable them to recommend the necessary enactments.

No adequate means have as yet been provided to guard against the emission of sparks from the chimneys of the engines which

would guard effectually against the danger arising from them, although, with proper care in the selection and preparation of fuel, it does not appear that the danger is very imminent.

It also appears, by the evidence of some of the witnesses examined, that although the management of the carriages is by no means difficult, when under the superintendence of an experienced conductor, yet that they require much greater skill than is necessary in the management of locomotive engines upon railways; and to find persons properly qualified, might be a matter of considerable difficulty.

It is essential that the size and weight of the carriages to be employed should be regulated, so as to prevent their being of that weight and size as to prove destructive to the roads, and serious nuisance to the public.

It appears, also, that the tolls intended to be imposed by the bill on the subject, are calculated upon an erroneous view of the power of a horse; the rate of toll is calculated upon by a supposition, that each horse is able to draw a ton weight; whereas, it is shown that a horse at a rapid pace cannot, upon ordinary roads, draw more than half that weight.

The Committee entertain serious objections to the Bill referred to them; and they are not of opinion that these objections are counterbalanced by the prospect of any great public advantage. The evidence, on the contrary, proves that the proposed mode of conveyance can only be applied to passengers; and it appears that some experienced engineers, after a careful examination of the expenses attendant upon it, have been induced to abandon all hopes of its success as a profitable undertaking.

It is probable, therefore, that any encouragement on the part of the Legislature would only give rise to wild speculations, ruinous to those engaging in them, and to experiments dangerous to the public. The Committee, therefore, recommend that the Bill should not at present be proceeded with; at the same time, they have no doubt that the further imposition of prohibiting tolls in local acts is not a desirable mode of legislation upon such a subject.

SCIENTIFIC NOTICES.

(Continued from p. 386.)

PARIS.—IRON RAIL-ROAD FROM PARIS TO ST. GERMAIN.

We are informed that the anonymous society which has undertaken this line of rail-road, consists of MM. Rothschild, brothers, J. C. Davilliers and Co., and several other eminent names. M. E. Pereire, in the capacity of acting director, will superintend the execution of the determinations of the board of administration of the Society. The execution of the works, and of the machines to be employed, is intrusted to three engineers. The capital consists of five millions of francs (200,000*l.*), divided into ten thousand shares.—*An. de la Société Polytéchnique, No.* 17. p. 151.

GAS-LIGHTS.

It is stated that the lighting of the Triumphal Arch de l'Etoile (Champs Elysée) of the Prefecture of the Police, and of the Mint, will be shortly effected by means of *portative gas, uncompressed.* This mode will exclude the necessity of laying subterraneous gas-pipes: it has been for some years past adopted in the city of Rheims. The discovery of uncompressed gas is attributed to M. Houzeau-Nuiron, our distinguished chemist.—*Ibid.*

LIQUIFIED CARBONIC ACID.

We are indebted to M. Thilorier for the discovery of the process by which this acid may be obtained in quantities in a very few moments. By means of his apparatus, he obtains, from chemical combination, a litre (quart) of liquified carbonic acid in a short space of time; and he has already studied its principal properties, which had engaged the attention of M. Faraday, who obtained it only in small quantities. It is the substance of all others, not excepting carbonated hydrogen gas, which expands and contracts to the greatest degree: this property may become the powerful instrument of effecting great changes in our machi-

nery and motive principles, as it is infinitely more effective and economical than any based upon the evaporation and condensation of fixed liquids, such as steam from water.

Another singular property of this new agent, is the excessive degree of cold produced by the sudden evaporation or volatilization of the acid, the temperature becomes lowered to 95° below zero of the centigrade thermometer; and M. Thilorier, who has obtained this result, expects to be able to reduce the temperature below 150° under zero. This property of the liquified acid may become of the highest importance in numberless processes of the arts and sciences.—*Ibid.* p. 152.

EUROPE.

The atmosphere of Europe is more highly and generally charged with electric fluid than any other portion of the globe; storms and hail are here more frequent than in any other quarter. The highest point of Europe is about 17,000 feet (French) above the level of the sea; that of America is 20,000 feet; and that of Asia, 25,000 feet. The mountains of Europe contain vast masses of water, which tend to the advantages of commerce, by means of six hundred navigable rivers. About two-thirds of the surface of Europe are applicable to the purposes of cultivation and vegetable production: in this respect it is nearly on a par with America, and has the advantage of Asia and of Africa; in the latter portion of the globe, only one-third of the soil is capable of cultivation; but as to the *power of vegetation*, Europe is inferior to the other quarters. Lemons, oranges, olives, and rice, may be cultivated to the 43° of latitude; the vine to the 50°; wheat, and the most valuable commercial products—such as flax, hemp, and tobacco, and fruit trees generally, may be cultivated to the 60°; at 62°, plum trees, hemp, hops, the cole genus, the oak, poplar, &c. cease to prosper. Up to the 70° of latitude, pines, firs, rye, oats, mosses, and common grasses may be found. As to animals, fine breeds of horses will not be found beyond 55°, nor hogs beyond 60°. The precious metals are to be found in the south of Europe; almost every other metal and mineral in the northern parts.

RAILROAD CARRIAGES.

The Academie des Sciences of Lyons have offered a prize, consisting of a gold medal of the value of 300 francs, to any person who could answer the following question:—" What are the modifications necessary in the construction of carriages employed on railroads, or in the disposition of the rails to diminish friction, and allow the carriages to run upon a road slightly curved with great velocity?" The prize has been adjudged to M. Alexandre Fournet, civil engineer. The means which he adopts are as follows:—The wheels of his carriages move in the direction which is given to them by the curved road upon which they run. They follow one after the other, and are attached to each other by the axletrees, the ends of the axles being connected together by rods. The felley of the wheel presents a deep channel, the edges of which embrace the rail.

THE NUMBER OF STEAM-ENGINES IN USE IN BELGIUM, IN COMPARISON WITH THOSE EMPLOYED IN FRANCE.

There are at the present time in action in the province of Liege 216 steam-engines, producing altogether the united power of 5446 horses. Of these 216 machines, there are 139 on the right side of the river Meuse, and producing a power equal to 2176 horses, and 79 on the left side of this river of the aggregate power of 3269 horses. Of the whole number of engines, there are only three of foreign manufacture. The most powerful is one of 300 horse power, and the weakest is of 1½ horse power.

In France, there is no engine exceeding 100 horse power. In the province of Liege there are eighteen engines of from 100 to 300 horse power; 20 from 50 to 100: 38 from 20 to 50; 139 from 5 to 20; and 1 of 1½ horse power. If the power of the engines in the province of Liege be added to that of the other Belgic provinces, the total amount of steam power will equal that exerted by 20,000 horses. It is principally at Charleroi and in its vicinity that the most powerful engines are found.

According to the notice published by the administration of bridges and roads in France, the united power of the 946 engines

in that kingdom, only amounts to a force equal to that exerted by 14,051 horses. The united power of the Belgic ones, according to this statement, then surpasses the aggregate power of all the steam-engines in France.

In comparing the respective population of the two countries, we find, according to this report, that the industry of the Belgians is twelve times more developed *than that of the French.—Recueil Industriel.*

EMPLOYMENT OF HOT AIR AS A MOVER, INSTEAD OF STEAM, PROPOSED BY M. BURDIN, CHIEF ENGINEER OF THE MINES.

The author considers that he can, with very great advantage, use compressed hot air instead of steam as a moving power. He supposes that atmospheric air at zero, and with a pressure of four atmospheres, will be forced, by means of a forcing pump, into a plate iron cylinder, furnished with bricks in the interior, for the purpose of preserving the heat and shutting in the furnace, covered with a layer of coal, sufficient to convert half the oxygen of the air into carbonic acid. This air thus acquires a temperature of 800° at least, and quadruples the volume without diminishing the pressure. He will then be able to produce, with the aid of two pistons, which he works by turns, a power much superior to that which was necessary for the introduction of the air, that is to say, at least double.

M. Burdin, in calculating all its effects, demonstrates that one kilogramme (about 2lbs.) of coal will produce, in this case, a force represented by 598,600 kilogrammes raised to six or seven times the real force of the best steam-engines constructed by Woolf. This advantage partly proves that, in the hot-air apparatus, the caloric disengaged by the combustible materials is entirely employed to the effect proposed; whilst in the boilers of steam-engines, one-half of the heat escapes by the chimney, and does not fulfil the proposed end of heating.—*Bulletin de la Société d'Encouragement.*

In a note under this notice, the Editor of the Bulletin says that the Society does not warrant the advantages of the machines

or instrument, nor the success of apparatus which appear in these notices; and that as this machine is only in contemplation, time and experience alone can pronounce judgment upon its advantages.

CONSUMPTION OF COAL IN STEAM-ENGINES.

Mr. Taylor stated, that the work done in the best engines now employed in Cornwall, by the consumption of one bushel of coal, required, ten or twelve years ago, the consumption of two bushels; that during the period of Bolton and Watt's patent, four bushels were consumed to do the same work; and that, in the earlier stages of the employment of steam power, the quantity of coal used was sixteen bushels. The steam-engines now at work in the mines of Cornwall, are equal in power to at least 44,000 horses.

CONTINENTAL RAILWAYS.

A Brussels journal says, "We may now go to Antwerp in one hour. Shortly, we shall be able to reach Paris in six hours, Berlin in sixteen, and St. Petersburgh in sixty. If it were possible to make a journey round the world on a continuous railroad, it would be accomplished in six weeks."

SUBSTITUTE FOR HOPS.

An inhabitant of Chatalet, Department du Nord, is said to have discovered that egg-shells may be used as a substitute for hops in brewing beer.—*Morning. Herald.*

FRANKFORT.

A communication has been made to the Society of Natural Sciences in this city, of the discovery of a new motive power, created by means of a galvanic battery. This discovery, it is calculated, may supersede the use of steam; it is stated to be more powerful, much less expensive, and less dangerous than steam.

CULTURE OF THE POTATOE.

A practical farmer, in the neighbourhood of Haddington, has ascertained, that in growing potatoes a great advantage may be

derived by plucking off the bloom from the stem, which practice prevents the ripening of the heavy crop of seed-apples, and produces an increase of at least 14 per cent. in the produce of the potatoes.—*Agriculturist.*

List of Patents

Granted in Scotland from 21st June to 21st July, 1836.

To John Woolrick, of Birmingham, professor of chemistry, for certain improvements in producing or making the substance commonly called or known by the name of carbonate of baryta, or carbonate of barytes.—21st June.

— William Taylor, of Southwark, and Henry Davies, of Stoke Prior, both engineers, for certain improvements in machinery or apparatus for introducing water or other fluids into steam-boilers or evaporating vessels; also for obtaining mechanical power by the aid of steam, and for communicating motion to vessels floating in water.—27th June.

— John Wilde, late of New York, now in Manchester, merchant, and Joseph Whitworth, of Manchester, engineer, partly communicated to them by foreigners residing abroad, for certain machinery for effecting the operation called knitting, and producing a fabric similar to that of knitted stockings.—29th June.

— David Fisher, of Wolverhampton, mechanic, for an improvement in steam-engines.—7th July.

— Hamer Stansfield, of Leeds, merchant, communicated to him by Christian William Schonherr, of Schneeberg, Saxony, for improvements in machinery for preparing certain threads or yarns, and for weaving certain fabrics.—8th July.

— Thomas Hock Shute, of Watford, silk throwster, for improvements in spinning and doubling organzine silk.—8th July.

— Robert Walter Kimburne, of South Shields, agent, for certain improvements in the manufacture of plate glass.—12th July.

To Edward Jelowicki, of 8, Seymour-place, Bryanstone-square, London, communicated by a foreigner residing aboad, for certain improvements in steam-engines.—15th July.

— Benjamin Simmons, of Winchester-street, Southwark, engineer, for improvements in chemical retorts, stills, and other apparatus, and in the machinery connected therewith, and by the use or employment thereof, various processes can be speedily, conveniently, and economically performed.—18th July.

— John Isaac Hawkins, of Chase Cottage, Pancras Vale, Hampstead-road, London, engineer, communicated by a foreigner residing abroad, for an improvement in the art of manufacturing iron and steel.—18th July.

— John Archibald, manufacturer, Aloa, Stirlingshire, for certain improvements in machinery or apparatus for carding wool, and doffing, strengthening, piecing, roving, and drawing rolls or cardings of wool.—21st July.

— William Wainwright Potts, of Burslem, Staffordshire, china and earthenware manufacturer, William Machin, china manufacturer, of Burslem, aforesaid, and William Bourne, also of Burslem, manager, for an improved method or process whereby impressions or patterns in one or more colours or metallic preparations are produced, and transferred to surfaces of metal, wood, cloth, paper, papier-machée, bone, slate, marble, and other suitable substances, prepared or otherwise, not being used or known as earthenware porcelain, china, glass, or other similar substances.—29th July.

— Walter Hancock, of Stratford, engineer, for an improvement or improvements upon steam-engines.—29th July.

— John Macdowall, of Johnstone, Renfrewshire, engineer, for certain improvements in machinery for sawing and cutting, and likewise in the mode of applying motive power thereto.—2nd August.

— Henry Walker Wood, 29, Austin-friars, London, merchant, for certain improvements in certain locomotive apparatus.—4th August.

— John Burns Smith, of Salford, spinner, and John Smith,

of Halifax, dyer, for a certain method or methods of tentering, stretching, or keeping out cloth to its width, made either of cotton, silk, wool, or any other fibrous substances, by machinery.—11th August.

To Henry Gore, of Manchester, machine-maker, for certain improvements in the machinery or apparatus for spinning or twisting cotton and other fibrous substances.—11th August.

— Samuel Hall, of Basford, for improvements in propelling vessels; also improvements in steam-engines, and in the method or methods of working some parts thereof, some of which improvements are applicable to other useful purposes.—15th August.

— Thomas Earl of Dundonald, of Regent's-park, London, for improvements in machinery or apparatus applicable to purposes of locomotion.—15th August.

— Joshua Bates, of Bishopsgate-street, London, merchant, in consequence of a communication made to him by a foreigner residing abroad, for certain improvements in machinery for cleaning and preparing wool.—19th August.

New Patents
SEALED IN ENGLAND,
August, 1836.

To Nathan Bailey, of Leicester, in the county of Leicester, framesmith, for his invention of certain improvements in, or additions to, machinery for manufacturing stocking fabric.—Sealed 1st August—6 months for inrolment.

To John Thomas Betts, of Smithfield Bars, in the city of London, rectifyer, for improvements in the process of preparing spirituous liquors in the making of

brandy, being a communication from a foreigner residing abroad.—Sealed 3rd August—6 months for inrolment.

To Webster Flockton, of the Spa-road, Bermondsey, in the county of Surrey, turpentine and tar distiller, for his invention of certain improvements in preserving timber.—Sealed 3rd August—6 months for inrolment.

To John Archibald, of the parish of Alva, in the county of Stirling, in the kingdom of Scotland, manufacturer, for his invention of certain improvements in machinery or apparatus for carding wool, and doffing, straightening, piecing, roving, and drawing rolls or cardings of wool.—Sealed 6th August—6 months for inrolment.

To Ramsay Richard Reinagle, of Albany-street, Regent's-park, in the county of Middlesex, Esq., for his invention of improvements in the construction of carriages for the conveyance of persons and goods, or merchandise.—Sealed 6th August—6 months for inrolment.

To Thomas Binns, of Mornington-place, in the Hampstead-road, in the county of Middlesex, civil engineer, for his invention of improvements in railways, and in the steam-engines to be used thereon and for other purposes.—Sealed 6th August—6 months for inrolment.

To Thomas John Fuller, of the Commercial-road, Limehouse, in the county of Middlesex, civil engineer, for his invention of a new or improved screen for intercepting or stopping the radiant heat arising or proceeding from the boilers and cylinders of steam-engines.—Sealed 9th August—6 months for inrolment.

To John Burns Smith, of Salford, in the county of

Lancaster, spinner, and John Smith, of Halifax, in the county of York, dyer, for their invention of a certain method or methods of tentering, stretching, or keeping out cloth to its width, made either of cotton, silk, wool, or any other fibrous substances, by machinery.—Sealed 10th August—6 months for inrolment.

To Henry Pershouse Parkes, of Dudley, in the county of Worcester, iron merchant, for his invention of improvements in flat pit chains.—Sealed 11th August—6 months for inrolment.

To Joseph Douglass, of Morpeth, in the county of Northumberland, rope maker, for his invention of improvements in the manufacture of oakum.—Sealed 11th August—2 months for inrolment.

To Edward Light, of Royal-street, Lambeth, in the county of Surrey, civil engineer, for his invention of certain improvements in propelling vessels and other floating bodies.—Sealed 11th August—6 months for inrolment.

To William Newton, of the Office for Patents, Chancery-lane, in the county of Middlesex, for improvements in the means of producing instantaneous ignition, being a communication from a foreigner residing abroad.—Sealed 11th August—6 months for inrolment.

To Robert Allen Hurlock, of Whaddon, in the county of Cambridge, clerk, for his invention of improvements in axletrees.—Sealed 11th August—2 months for inrolment.

To Joshua Butters Bacon, of Regent-square, in the county of Middlesex, gentleman, for improvements in the structure and combination of certain apparatus employed in the generation and use of steam.—Sealed 13th August—6 months for inrolment.

To Thomas Gauntley, of the town and county of the town of Nottingham, mechanic, for his invention of certain improvements in machinery for making lace and other fabrics, commonly called warp machinery.—Sealed 15th August—6 months for inrolment.

To George Leech, of 25, Norfolk-street, in the parish of Islington, in the county of Middlesex, carpenter, for his invention of a certain improved method of connecting window sashes and shutters, such as are usually hung and balanced by lines and counter weights with the lines by which they are so hung.—Sealed 15th August—6 months for inrolment.

To William Fothergill Cooke, of Bellayse College, in the county of Durham, Esq., for his invention of improvements in winding up springs to produce continuous motion, applicable to various purposes.—Sealed 17th August—6 months for inrolment.

To Joseph Hall, of Margaret-street, Cavendish-square, in the county of Middlesex, plumber, for his invention of improvements in the manufacture of salt.—Sealed 17th August—2 months for inrolment.

To Francois de Tausch, of Percy-street, Bedford-square, in the county of Middlesex, military engineer to the King of Bavaria, for his invention of improvements in apparatus or machinery for propelling of vessels for raising water, and for various other purposes.—Sealed 25th August—6 months for inrolment.

CELESTIAL PHENOMENA, FOR SEPTEMBER, 1836.

D.	H.	M.	
1			Clock after the ⊙ 9m. 14s.
—			☽ rises 9h. 3m. A.
—			☽ passes mer. 4h. 22m. M.
—			☽ sets 0h. 18m. A.
—			Occul. A Tauri, im. 16h. 54m., em. 18h. 11m.
2	11	48	☽ in □ or last quarter.
4	13		☽ in Apogee.
	21	51	☿ in the descending node.
	23	47	♂ in conj. with the ☽ diff. of dec. 3. 49. S.
5			Clock after the ⊙ 1m. 31s.
—			☽ rises 11h. 35m. A.
—			☽ passes mer. 7h. 39m. M.
—			☽ sets 4h. 35m. A.
	16		♀ in conj. with the ☽ diff. of dec. 9. 43. S.
7	5	2	♃ in conj. with the ☽ diff. of dec. 4. 46. S.
	13	16	Ceres in oppo. ⊙ intens. of light 0,678.
10			Clock after the ⊙ 3m. 12s.
—			☽ rises 4h. 22m. M.
—			☽ passes mer. 11h. 40m. M.
—			☽ sets 6h. 40m. A.
11	0	43	Ecliptic conj. or ● new moon.
12	5	43	☿ in conj. with the ☽ diff. of dec. 3. 57. S.
	16	36	♃'s fourth sat. will em.
13	22	11	♄ in conj. with the ☽ diff. of dec. 1. 33. N.
15	1	13	☿ in Aphelion.
17			Mercury R. A. 10h. 4m. dec. 13. 40. N.
—			Venus R. A. 8h. 45m. dec. 14. 44. N.
—			Mars R. A. 7h. 17m. dec. 22. 57. N.
—			Vesta R. A. 14h. 19m. dec. 9. 27. S.
—			Juno R. A. 11h. 24m. dec. 3. 28. N.
17			Pallas R. A. 20h. 41m. dec. 5. 14. N.
—			Ceres R. A. 23h. 24m. dec. 21. 6. S.
—			Jupiter R. A. 8h. 49m. dec. 18. 15. N.
—			Saturn R. A. 14h. 6m. dec. 10. 25. S.
—			Georg. R. A. 22h. 15m. dec. 11. 37. S.
—			☿ passes mer. 1h. 20m.
—			♀ passes mer. 20h. 59m.
—			♂ passes mer. 19h. 30m.
—			♃ passes mer. 21h. 1m.
18	4	19	☽ in □ or first quarter.
	15	47	♀ in conj. with ♃ diff. of dec. 3. 36. S.
19	20		☽ in Perigee.
—			Clock after the ⊙ 6m. 42s.
—			☽ rises 4h. 46m. A.
—			☽ passes mer. 8h. 29m. A.
—			☽ sets morn.
—			Occul. Capri, im. 5h 25m., em. 6h. 29m.
	15	38	♃'s first sat. will im.
22	4	57	♅ in conj. with the ☽ diff. of dec. 4. 23. N.
	12	37	⊙ enters Libra, Autumn commences.
24	11	48	Ecliptic oppo. or ○ full moon.
	16		♃'s second satt. will im.
25			Clock after the ⊙ 8m. 26s.
—			☽ rises 6h. 21m. A.
—			☽ passes mer. morn.
—			☽ sets 6h. 23m. M.
26	23	27	☿ greatest elong. 25. 46. E.
30			Clock after the ⊙ 10m. 6s.
—			☽ rises 7h. 55m. A.
—			☽ passes mer. 3h. 49m. M.
—			☽ sets 0h. 26m. A.

J. LEWTHWAITE, Rotherhithe.

METEOROLOGICAL JOURNAL,

FOR JULY AND AUGUST, 1836.

1836.	Thermo. Hig.	Thermo. Low.	Barometer. High.	Barometer. Low.	Rain in inches.	1836.	Thermo. Hig.	Thermo. Low.	Barometer. High.	Barometer. Low.	Rain in inches.
July						Aug.					
26	69	53	30,02	29,99	,025	10	72	42	30,11	30,10	
27	73	57	30,05	30,03		11	71	49	30,24	30,20	
28	77	50	30,00	29,90		12	71	53	30,25	30,21	
29	68	57	29,66	29,55	,175	13	75	47	30,16	30,00	
30	64	52	30,12	29,81	,1	14	73	54	29,86	29,82	,025
31	68	47	30,40	30,26	,025	15	69	53	29,96	29,82	,075
Aug.						16	70	51	30,06	30,04	
1	68	50	30,10	29,95	,0125	17	74	56	30,01	29,99	
2	67	47	29,99	29,94		18	73	48	29,98	29,86	
3	75	52	29,96	29,76		19	69	53	30,07	30,03	,025
4	71	53	29,83	29,76		20	63	44	29,91	29,56	
5	72	56	29,95	29,89		21	64	44	29,85	29,81	,05
6	67	54	30,06	30,02		22	67	47	29,74	29,62	
7	70	46	30,11	Staty.		23	61	53	29,64	29,54	,05
8	72	50	30,09	30,08		24	61	47	30,05	29,83	,875
9	69	44	30,11	Staty.		25	66	43	30,07	29,98	

Edmonton. CHARLES HENRY ADAMS.

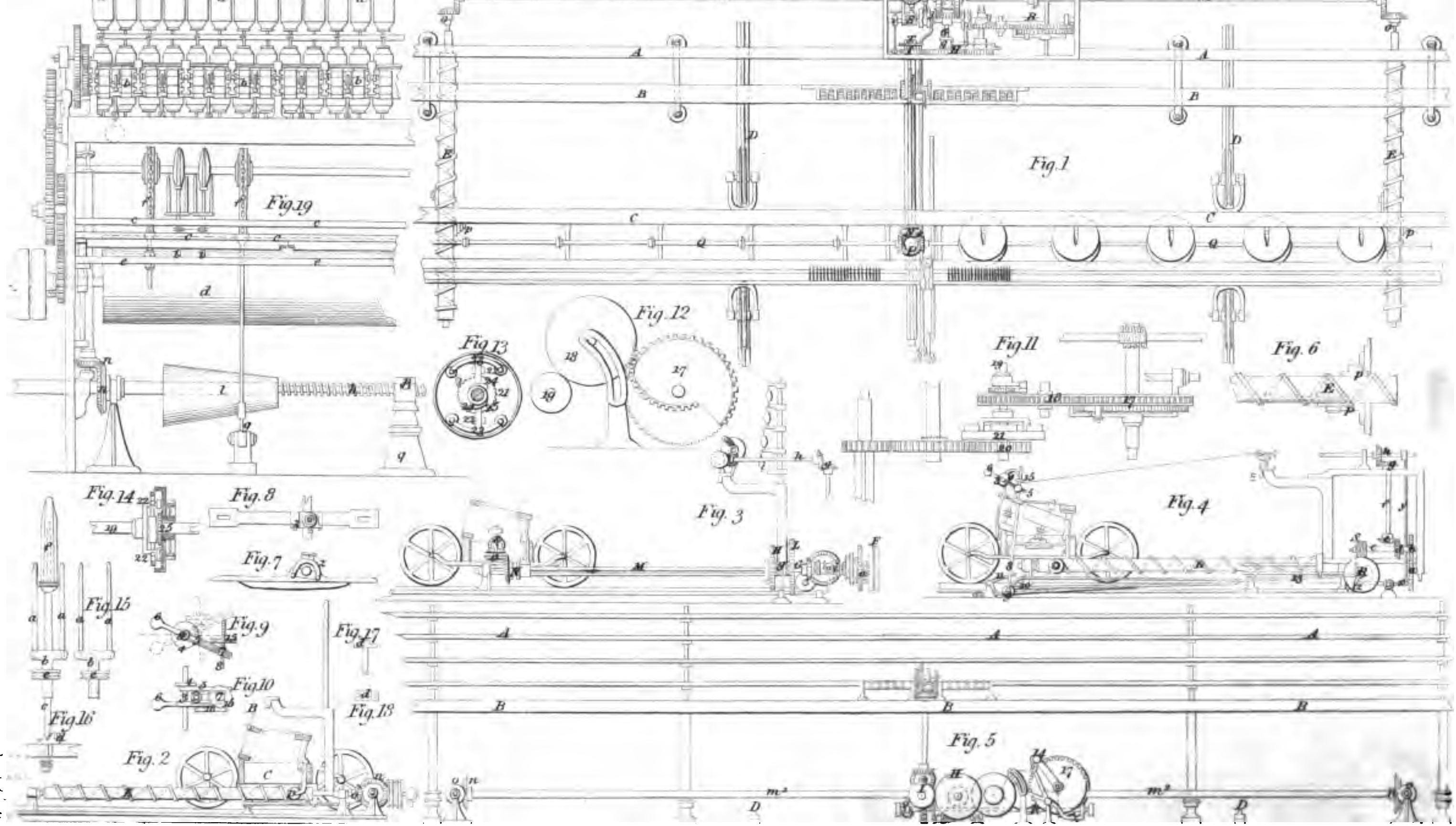
Latitude 51° 37 32 N.
Longitude 3 51 West of Greenwich.

INDEX TO VOL. VIII.

[CONJOINED SERIES.]

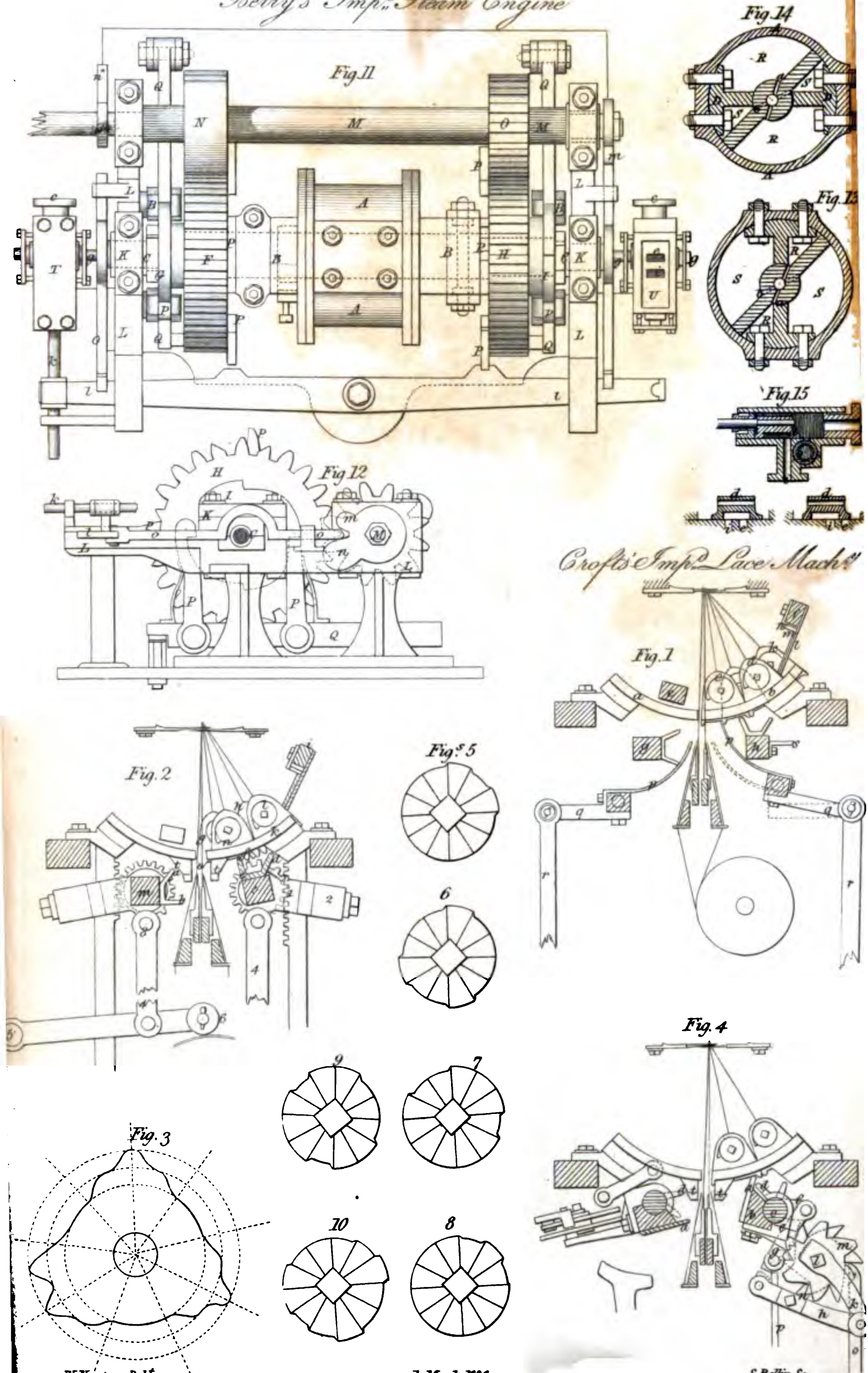
REPORTS OF RECENT PATENTS.

Whitworth's Impts. in Spinning



Berry's Impd. Steam Engine

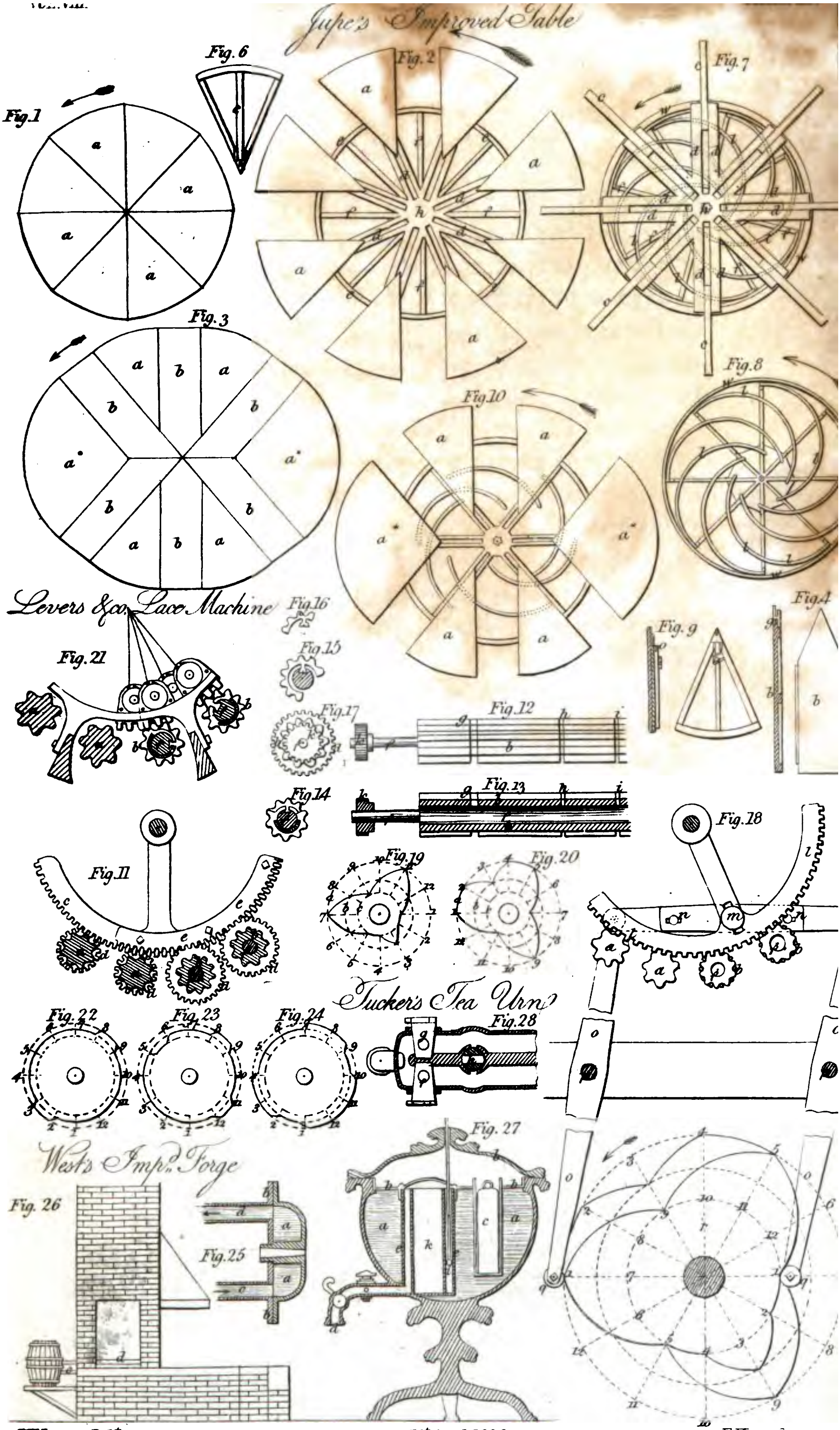
Crofts' Impd. Lace Machy.



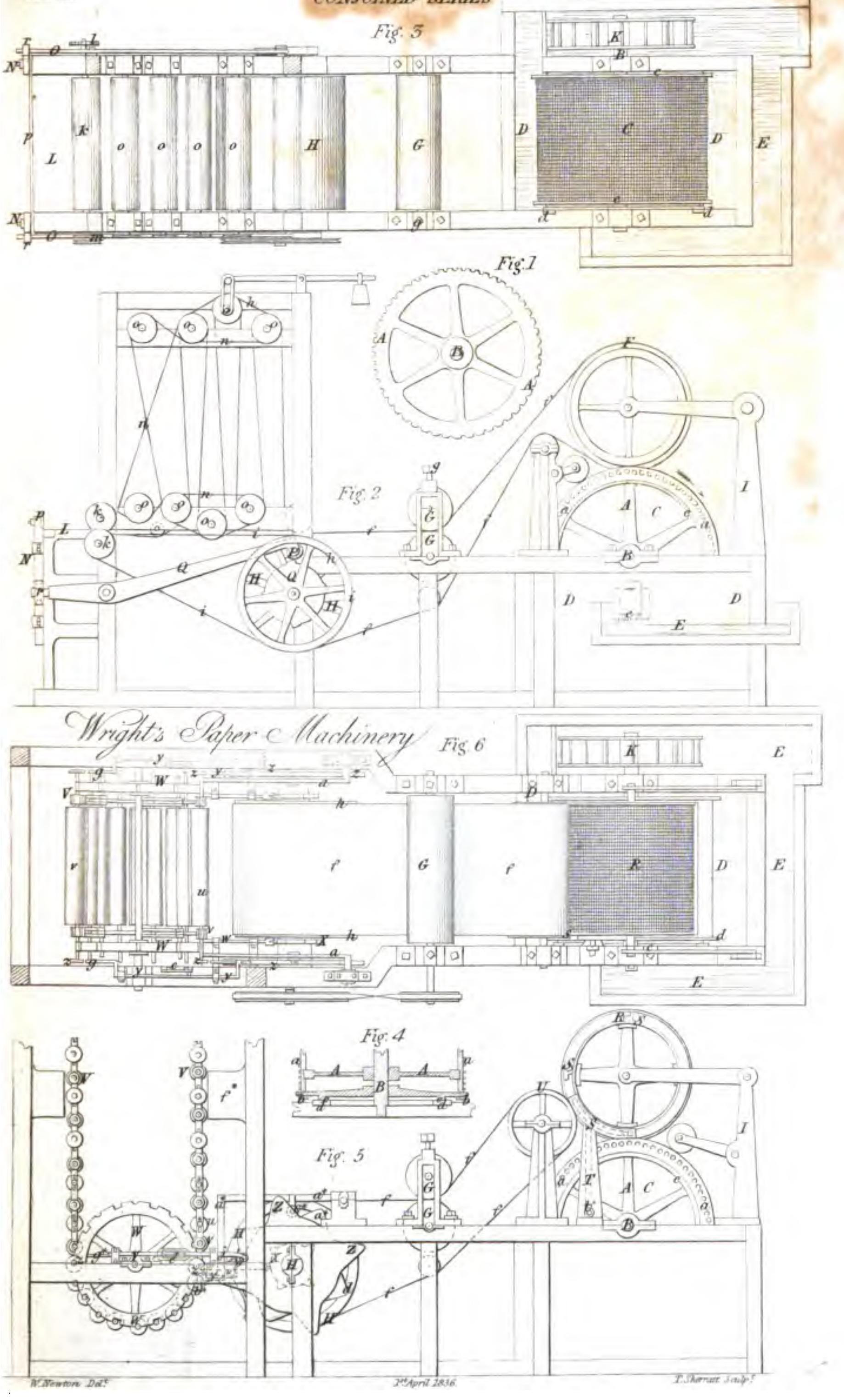
W. Newton Del.t

1 March 1836.

S. Bellin Sc.

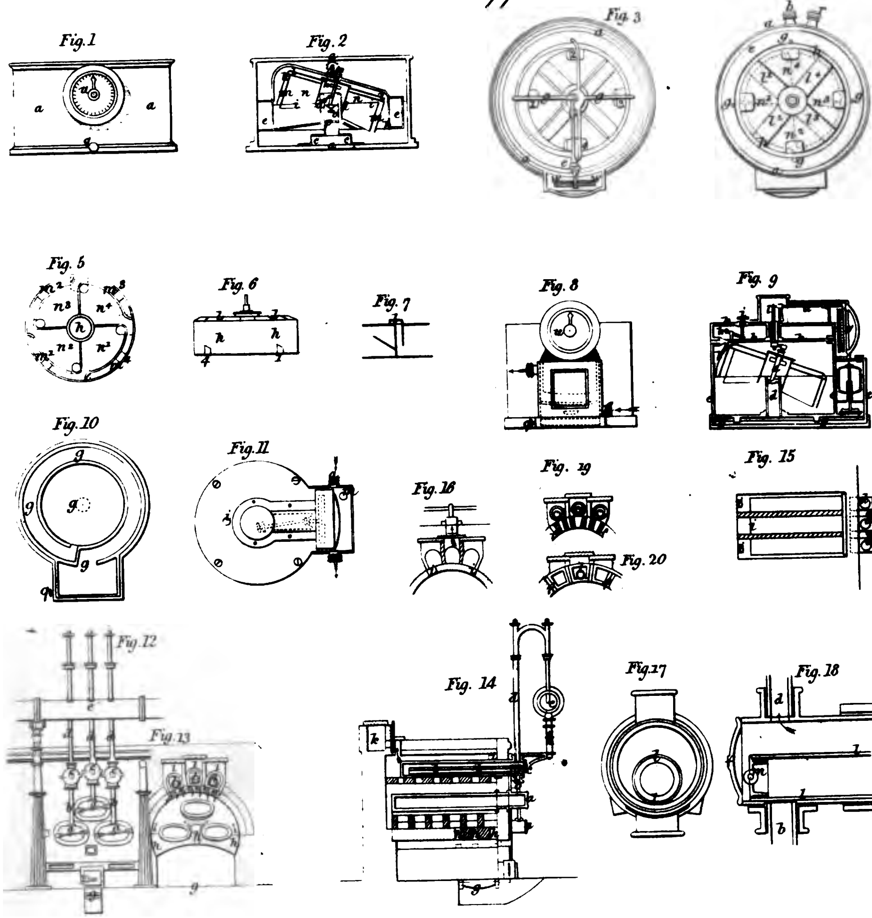


W. Newton Del.t 1st April 1836. F. Yates Sc.

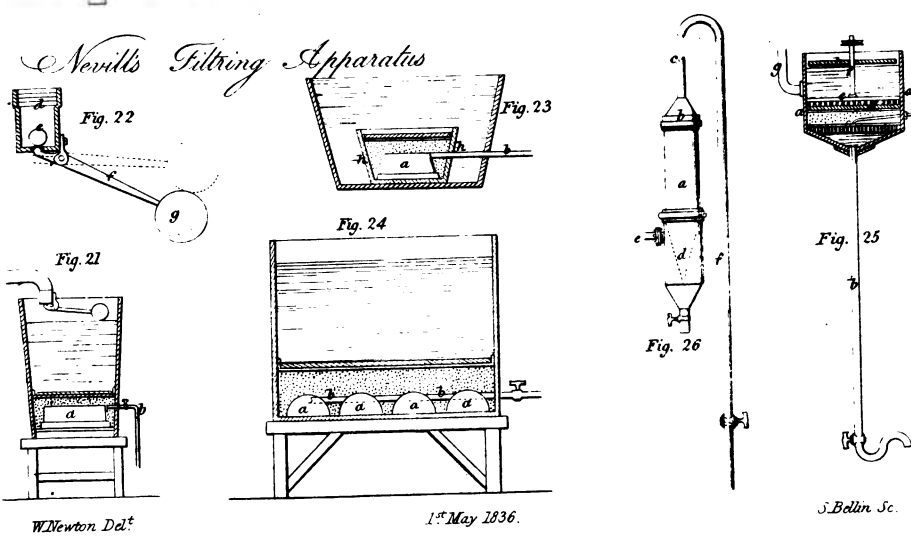


W. Newton Del.t 1st April 1836. T. Sherratt Sculp.t

Malam's Gas Apparatus



Nevill's Filtering Apparatus



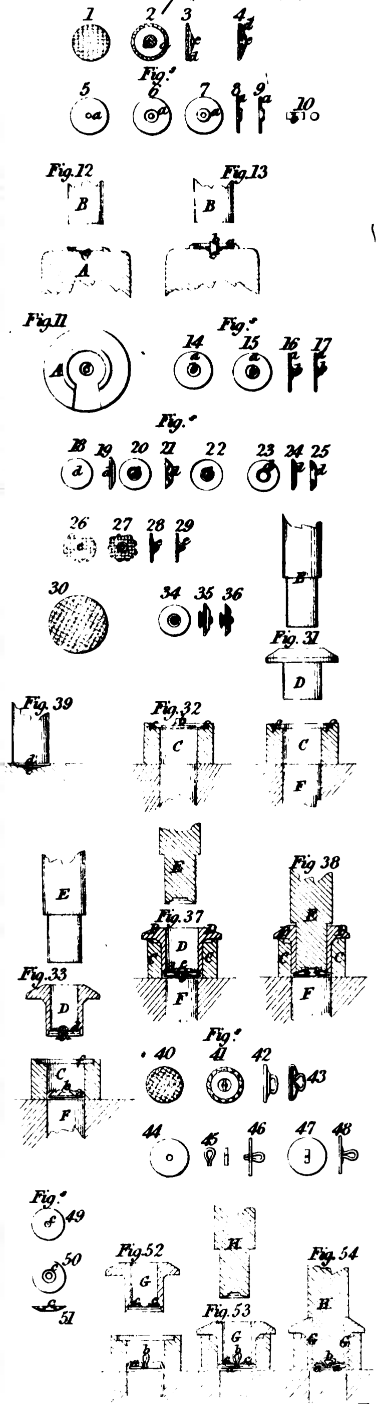
W. Newton Del.t

1st May 1836.

J. Bellin Sc.

PLATE VI.

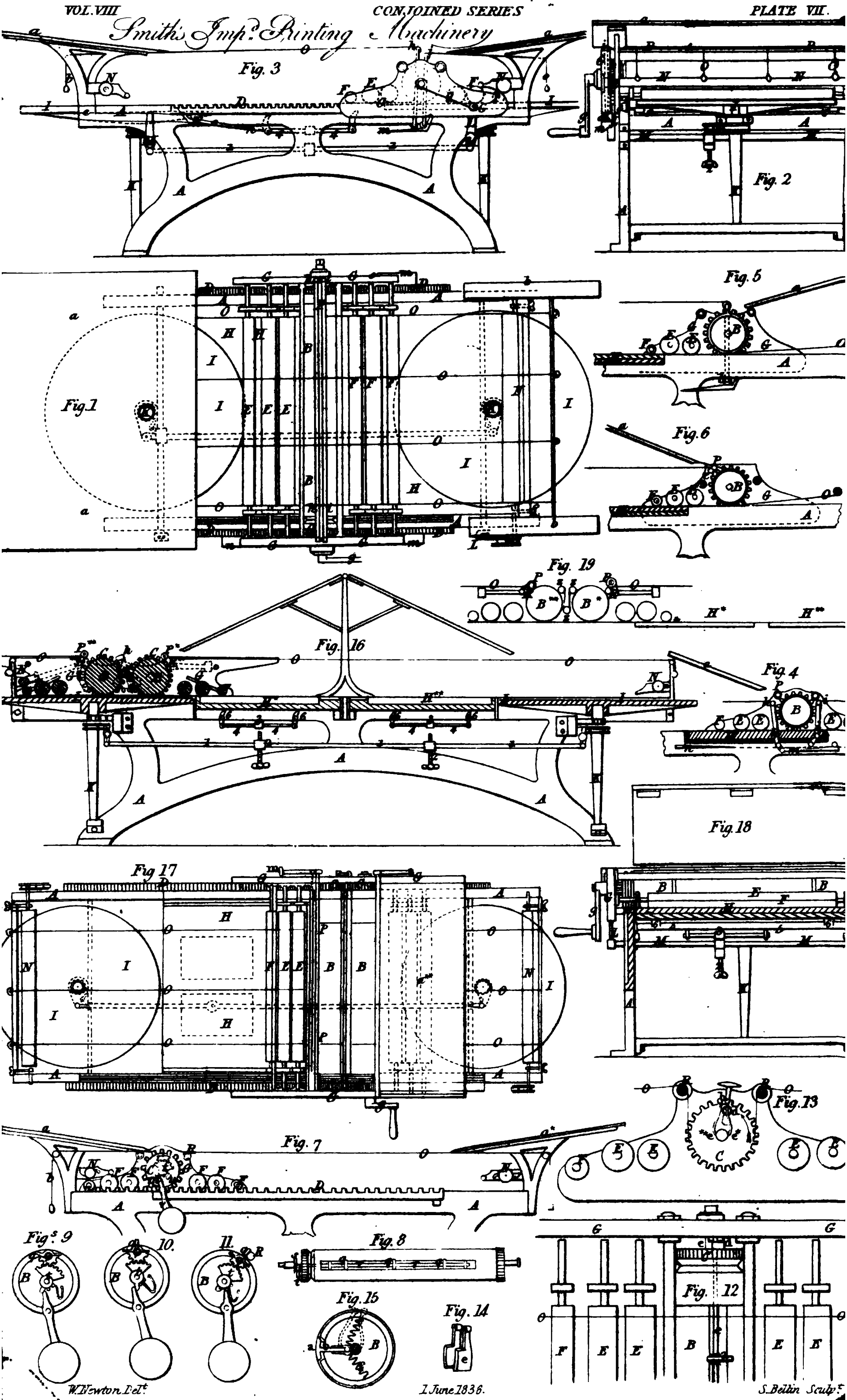
Burrell's Impᵈ Buttons



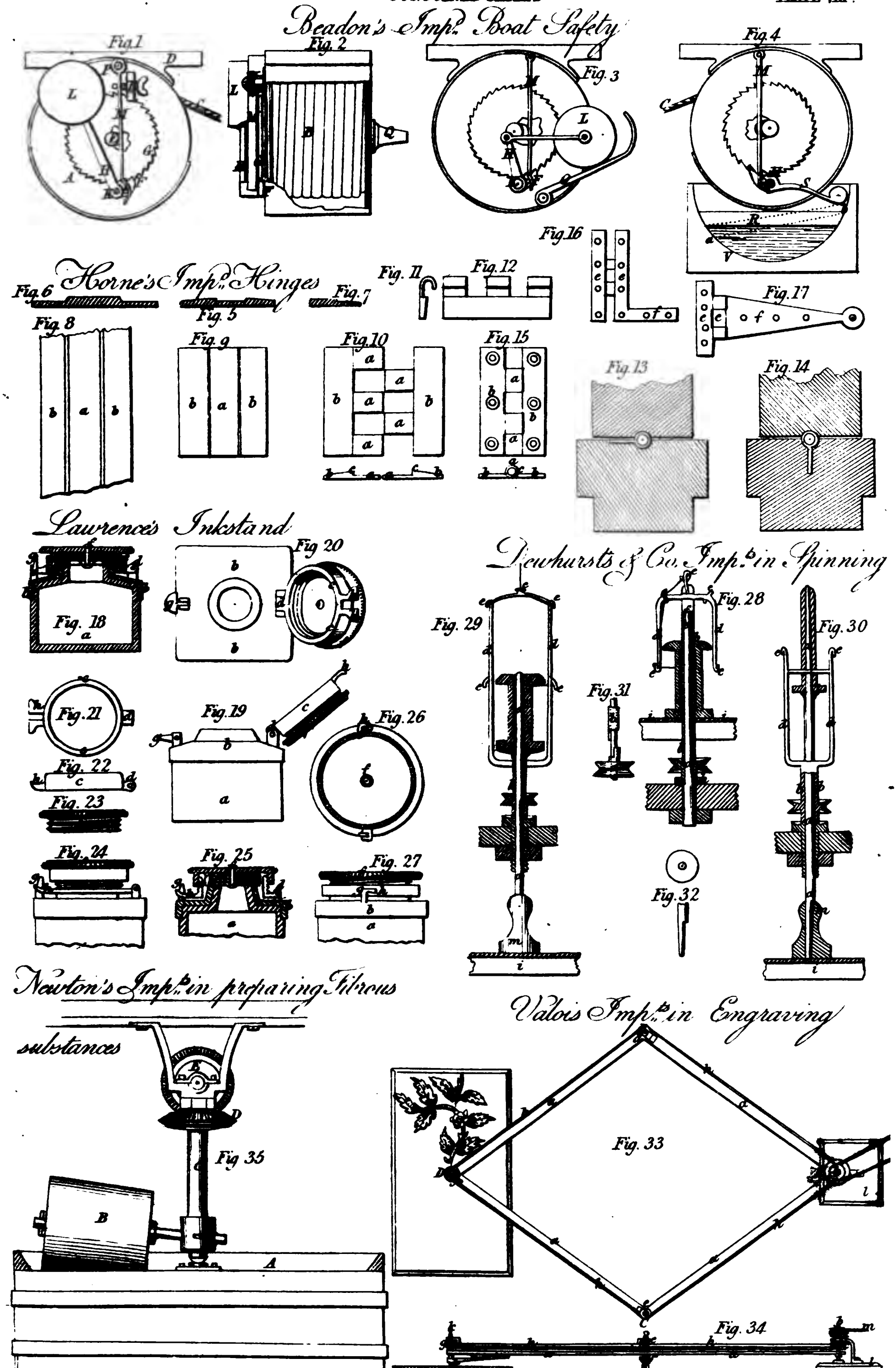
W. Newto

T. Sherratt Sc

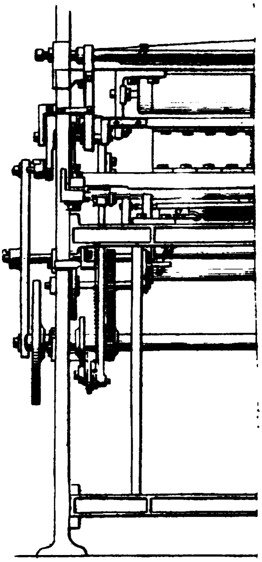
Smith's Impd. Printing Machinery

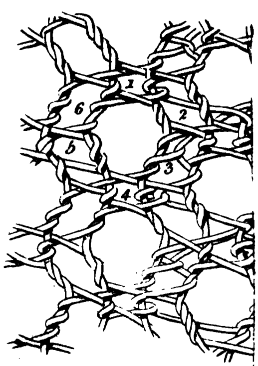


W. Newton Delt. 1 June 1836. S. Bellin Sculpt.



W. Newton Delt. 1 June 1836. E.P. Yates Sculpt.





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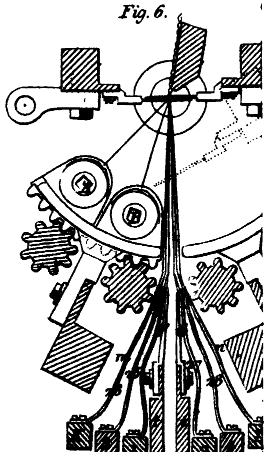
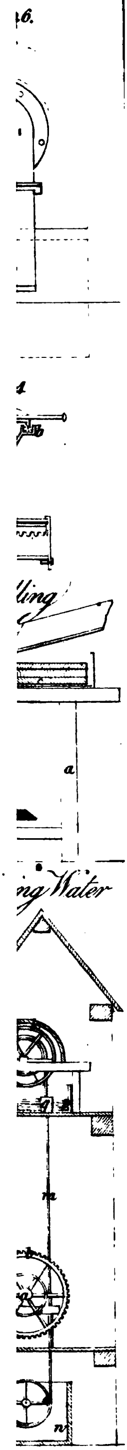
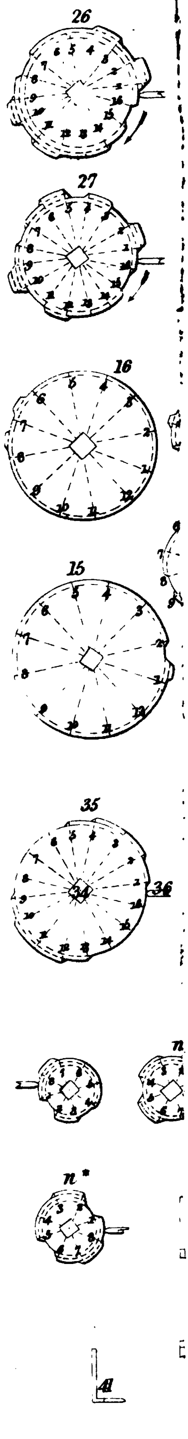
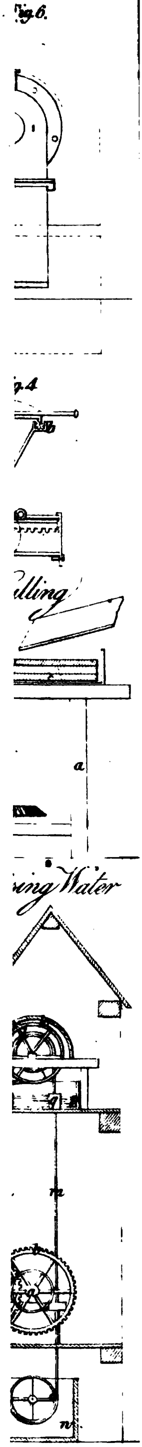




V. Newton Delt

G Winter Sculpt





W. Newton Del.t

G. Winter Sculp.t

Brunton's Gas Apparatus

Fig 5

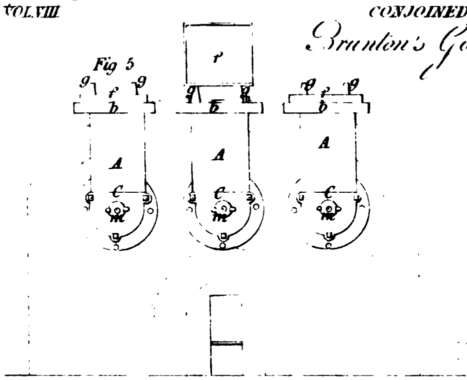


Fig. 6.

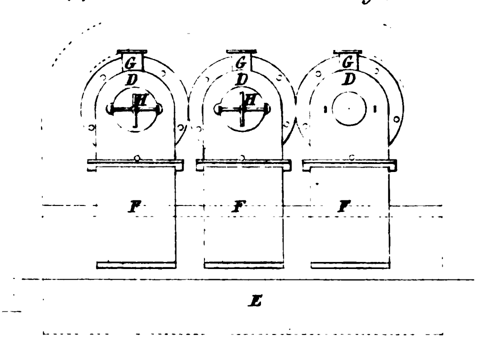


Fig. 1

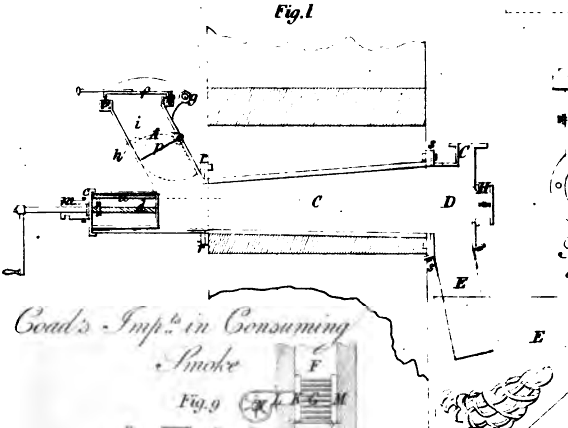
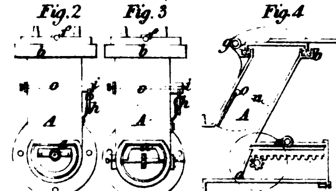
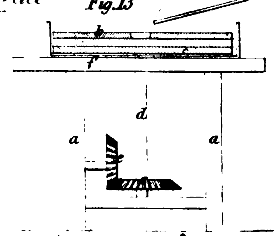


Fig. 2 Fig. 3 Fig. 4



Lyman's Imp.ts in Hulling Rice

Fig. 13



Coad's Imp.ts in Consuming Smoke

Fig. 9

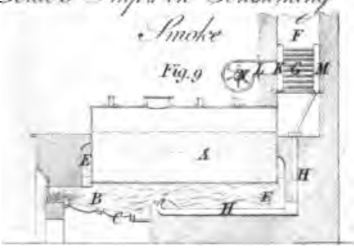


Fig. 7

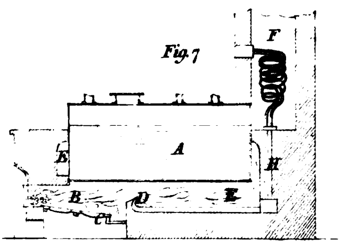


Fig. 8

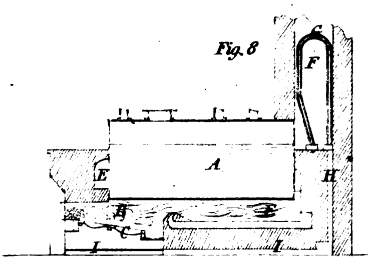


Fig. 10

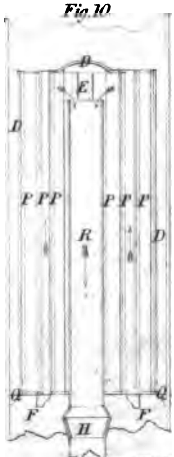
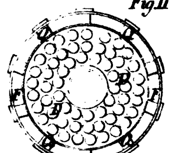
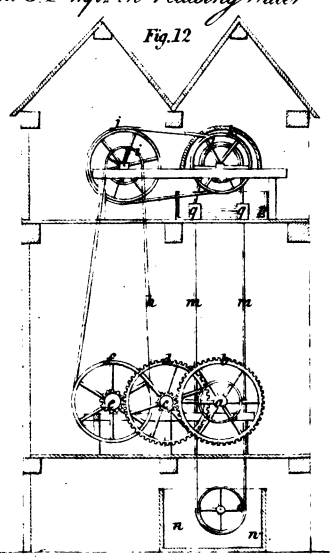


Fig. 11



Child's Imp.ts in Raising Water

Fig. 12



W. Newton Del.t 1.st July, 1836. G Winter Sculp.t

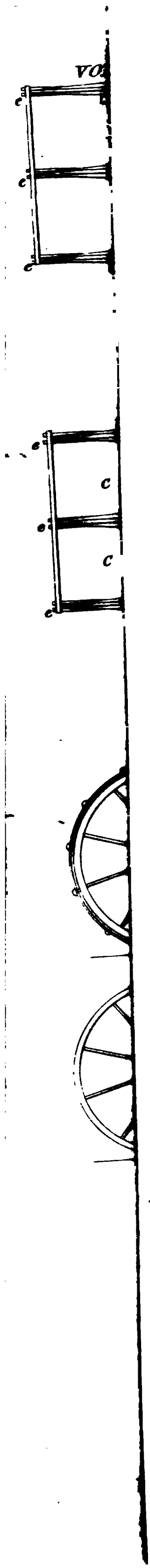

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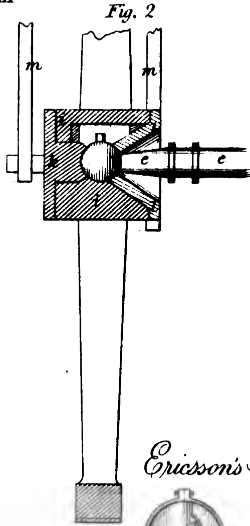
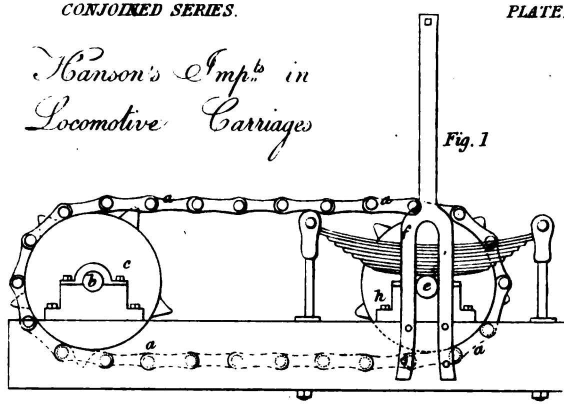
Fig. 2



Hanson's Impts. in Locomotive Carriages

Fig. 1



Ericsson's Impt. in communicating Power

Fig. 3

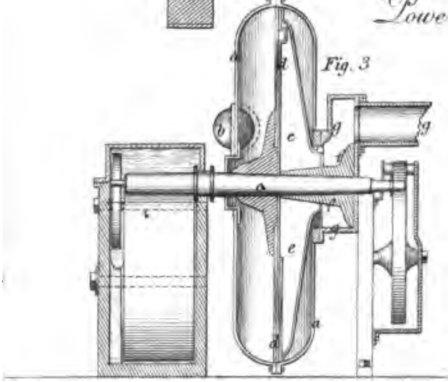
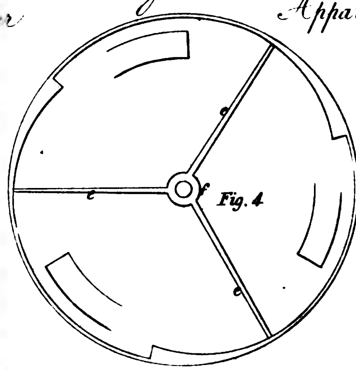


Fig. 4



Ericsson's Sounding Apparatus

Fig.

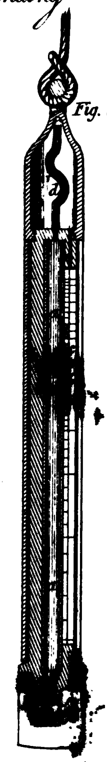
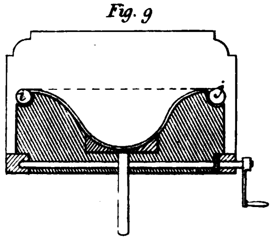
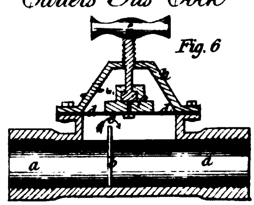


Fig. 9



Carter's Gas Cock

Fig. 6



Cherry's Invalid's Bed

Fig. 7

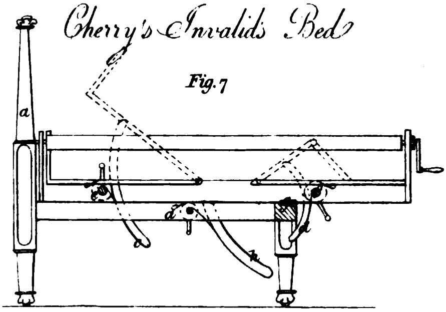
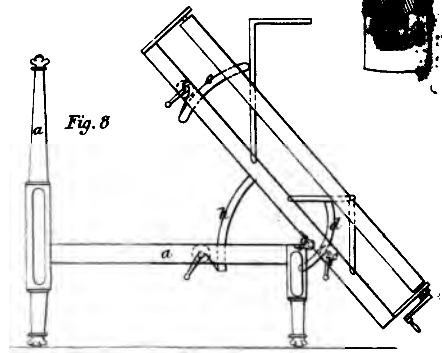
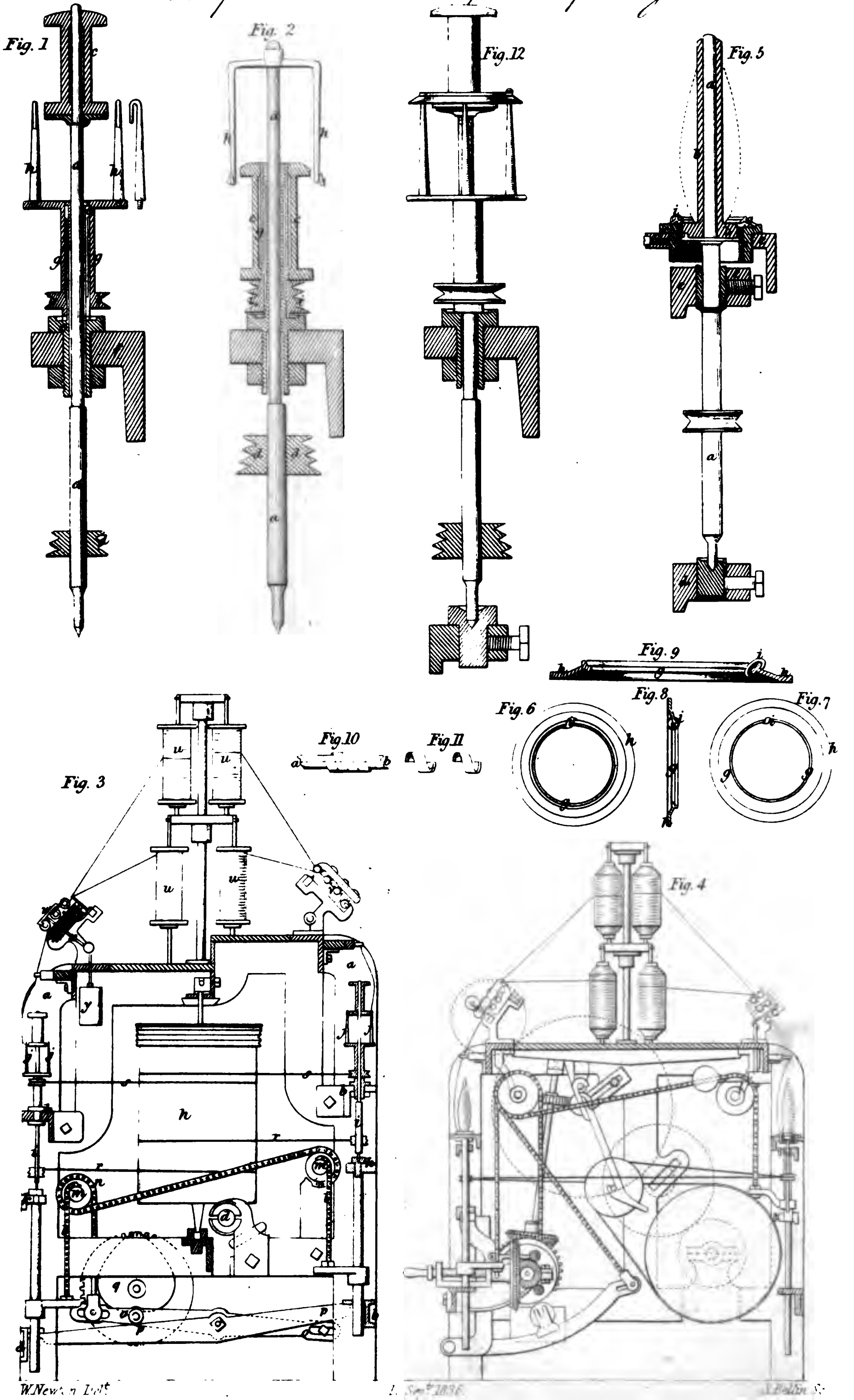


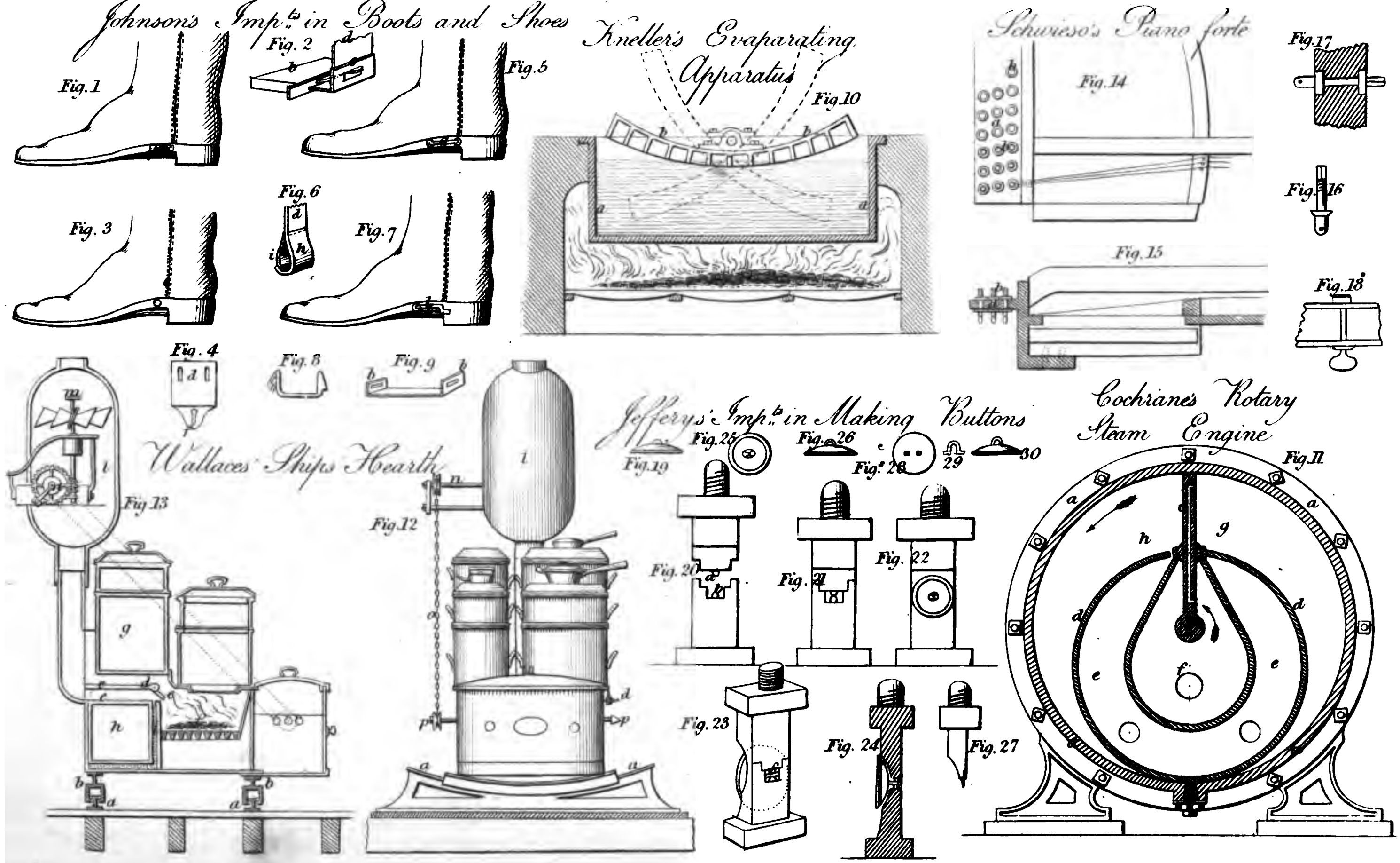
Fig. 8

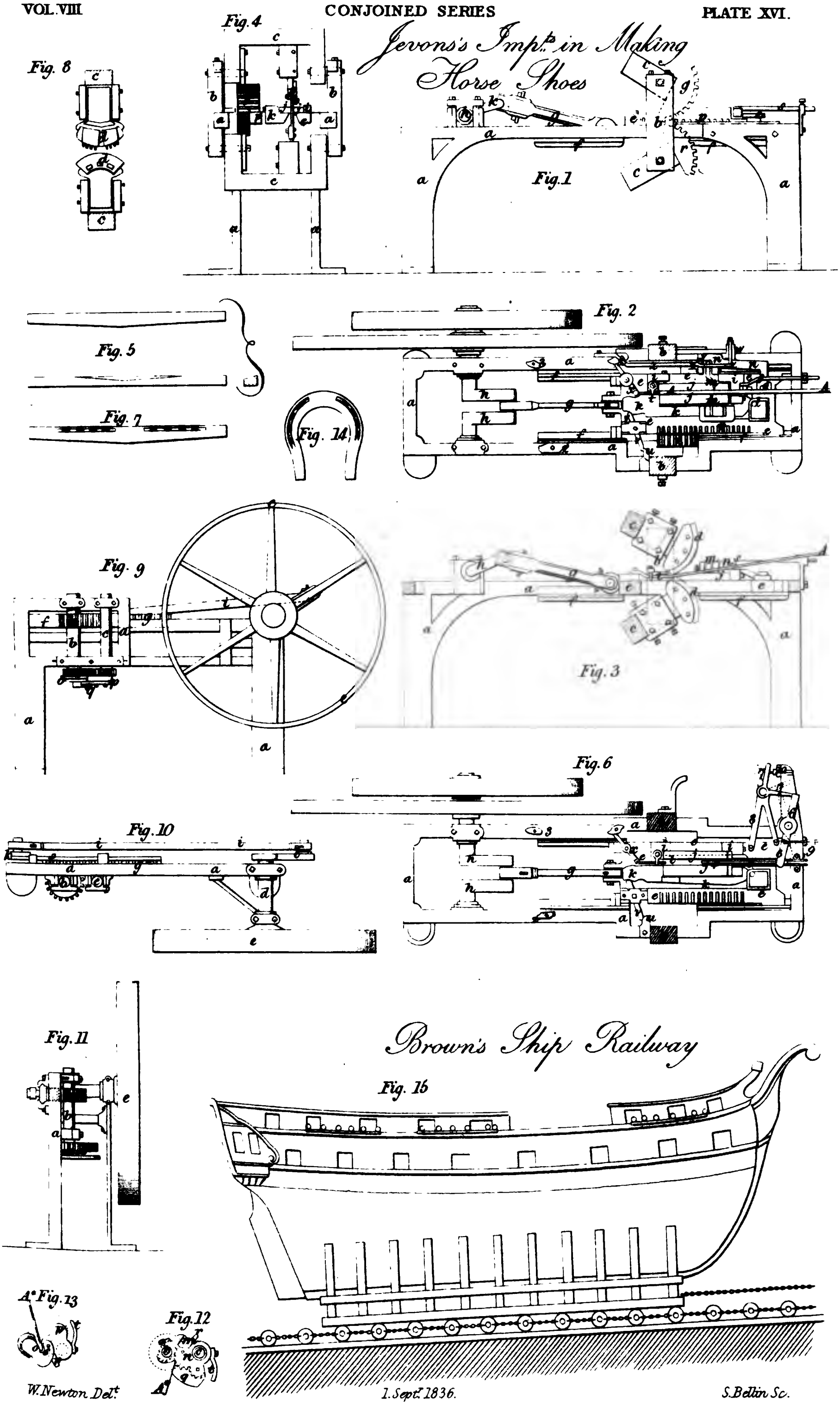


Sharp and Roberts's Impts. in Spinning



W. Newton Delt.


Johnson's Impts. in Boots and Shoes
Fig. 1
Fig. 2
Fig. 3
Fig. 4
Fig. 5
Fig. 6
Fig. 7
Fig. 8
Fig. 9
Kneller's Evaparating Apparatus
Fig. 10
Schwieso's Piano forte
Fig. 14
Fig. 15
Fig. 16
Fig. 17
Fig. 18
Wallaces' Ships Hearth
Fig. 12
Fig. 13
Jeffery's Impts. in Making Buttons
Fig. 19
Fig. 20
Fig. 21
Fig. 22
Fig. 23
Fig. 24
Fig. 25
Fig. 26
Fig. 27
Fig. 28
29
30
Cochrane's Rotary Steam Engine
Fig. 11



W. Newton Delt. 1. Septr. 1836. S. Bellin Sc.